

*Bally*  
**Eight Ball Deluxe**



*Bally* **MIDWAY** MFG CO

10601 W. Belmont Ave. • Franklin Park, Illinois 60131

Telephone (312) 451-9200



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10601 West Belmont Avenue Franklin Park, Illinois, 60131

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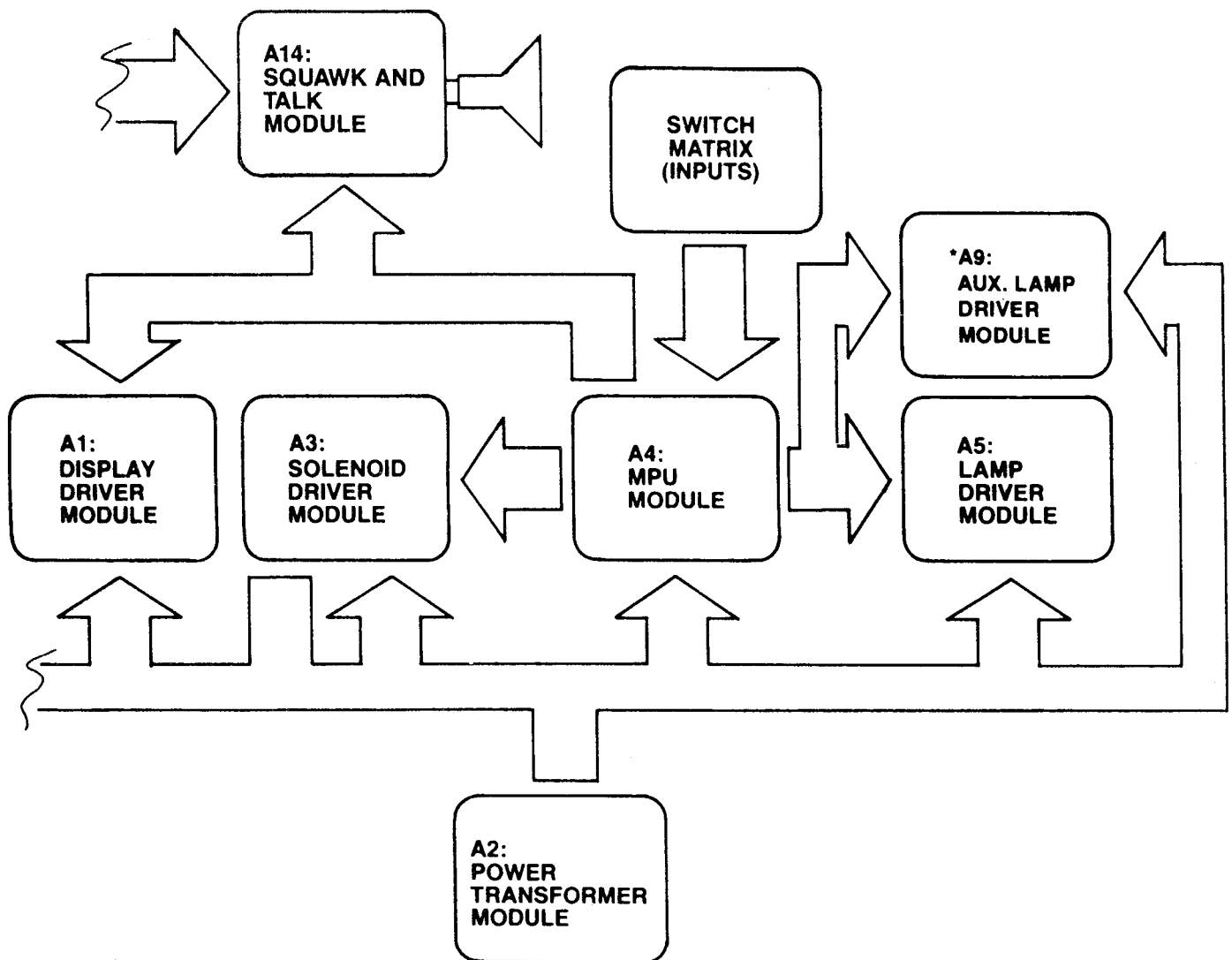
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# Installation and General Game Operation Instructions

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# BLOCK DIAGRAM—ELECTRONIC PINBALL GAME



## I. INSTALLATION

### Assemble the game as follows:

Bolt legs to cabinet. Bolt back box to cabinet. Use flat washers under bolt heads. Gently feed cable connectors and ground braid through cable port in back box. Screw ground braid to braid in back box. Carefully and fully insert connectors on printed circuit assemblies.

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable connectors may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switch should always be adjusted after game is set on location and leg levelers are adjusted.

Visual inspections before plugging in line cord:

1. Check that all cable connectors are completely seated on printed circuit assemblies.
2. Check that cables are clear of all moving parts.
3. Check for any wires that may have become disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
5. Check wires on coils for proper soldering. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
6. Check that fuses are firmly seated and making good contact.
7. Check the transformer for any foreign material shorting across wiring lugs.
8. Check wiring of transformer to correspond to location voltage. See figure 1.

Check adjustment of the three (normally open) tilt switches:

1. Panel tilt on bottom of playfield panel.
2. Plumb bob tilt on left side of cabinet near front door.
3. Ball tilt above plumb bob tilt. Insert the smaller ball (15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

## TRANSFORMER CONNECTION INSTRUCTIONS

**REFER TO POWER SUPPLY SCHEMATIC  
IN GAME MANUAL FOR TABLE "A"**

115 VAC, 2-8, 3-6, 7-10
120 VAC, 2-8, 4-6, 7-11
220 VAC, 4-8, 7-9
240 VAC, 4-8, 7-11

PART OF POWER—TRANSFORMER MODULE A2, LOCATED IN LOWER CABINET

## II. GENERAL GAME OPERATION

### Place ball into playfield by outhole.

**Coin game.** Coin should be rejected. Plug in line cord. Move power ON-OFF master switch at bottom right front corner of cabinet to 'ON' position. The game will play a power-up tune to announce game-readiness. Drop targets are reset, scores are set to zero, alternating with the 'High Score to Date,' and the game is ready for play. Coin game. The game should accept the coin and post credits\* for coins accepted (adjustable). Pressing the credit button on the door will cause the outhole kicker to serve the ball to the shooter alley. The 1st player-up lite is lit. A game-up tune\* is played to announce play-readiness.

One player is posted each additional time the credit button is pressed (one to four can play). The credits are reduced by one each time the credit button is pressed until the credits are reduced to zero.

Shooting the ball initiates play.

The game awards all points earned by the player. If spinner is turning and scoring when the ball hits a target, the spinner and the target scores are awarded.

When the ball enters the outhole, the bonus score is added to the total score. The player-up and/or ball in play on the back box is advanced one position. The outhole kicker serves the ball to the shooter alley and play is resumed. This continues until each player has played the allowable number of balls per game (adjustable). At this time the 'Game Over' light is lit. A random Match\* number appears and the 'Match' light is lit. If the number is the same as the last two digits in a player's score, a free game is awarded.

Extra balls won during the course of the game are played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play on the back box are not advanced for extra ball play. Bonus score is added to the player's score before the game serves the extra ball for play.

Scoring over 10,000,000 gives "High Score to Date" award.

At the end of the game, a 'High Score to Date' is alternately flashed with all 4 player scores. If the 'High Score to Date' is beat, this feature\* awards free games.

Tilting the game results in loss of a ball. The flippers, thumper-bumpers, etc., go 'dead.' Bonus points are not scored. The purpose of the tilt penalty is to discourage the player from jostling the machine in an attempt to prolong play. Game action becomes normal after the ball kicker assembly serves the ball to the shooter alley.

Slamming the machine results in loss of the game. All feature lights go out, the game goes 'dead,' and a time delay occurs. The purpose of the time delay is to discourage unnecessary abuse of the machine. After the delay, the 'Game Over' light lites and the power-up tune is played. The time delay occurs anytime one of the slam switches is made to contact. There are two factory installed slam switches, on the front door, and one on left side of cabinet. (Any number of slam switches could be installed by the operator, to meet his individual requirement.) The switch should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

\*Some tunes and features can be disabled by operator if so desired. See Back Box Adjustments.

**NOTE:** Scoring and feature units will differ from game to game.

### III. BOOKKEEPING FUNCTIONS

The game is designed to help the operator perform certain accounting functions. The game can display the number of total plays and replays (free games). It can display the number of coins dropped down each coin chute. The bookkeeping functions are displayed on all player score displays simultaneously. An identification number, 05 to 15, appears on the Match/Ball in Play window as follows:

- 05— 00 to— 40 = Current Credits
- \*06— 100000 to—99999 = Total Plays (Paid & Free Games)
- \*07— 10000 to—99999 = Total Replays (Free Games)
- 08— 00 to—99999 = Game Percentage
- 09— 00 to—99999 = Total times 'High Score to Date' is beat
- \*10— 10000 to—99999 = Coins Dropped thru Coin Chute #1
- \*11— 10000 to—99999 = Coins Dropped thru Coin Chute #2\*\*
- \*12— 10000 to—99999 = Coins Dropped thru Coin Chute #3\*\*
- \*13— 00 to—99999 = Number of Specials awarded from Panel Specials Only
- \*14— 00 to—99999 = Number of minutes of Game Play
- \*15— 00 to—99999 = Number of Service Credits

The game displays the first bookkeeping entry if the Self-Test button (See Fig. III) on the inside of the front door is pressed ten times. Alternately push and release the Self-Test button at one second intervals. The number 05 appears in the 'Match/Ball in Play' window. Current credits appear on the player score displays. Each additional press of the button causes the next entry to be displayed.

After the data in each bookkeeping register is recorded, it can be set to zero simply by pressing switch button S33, located on A4, the MPU module in the back box (See Fig. III), or by pressing the Coin Chute #3 switch. Any or all registers can be cleared by alternating between the Self-Test button and the switch button S33 on the MPU module or Coin Chute #3 switch. The operator is given this option as a possible convenience and can elect to use or not use it as his needs direct.

Pressing the button 5 more times causes the game to play the power-up tune and light the Game Over light.

Service credits are designed to allow the serviceman to test the game under actual play conditions without disturbing the bookkeeping records that reside at identification numbers 06, 07, 10, 11 and 12.

To obtain Service Credits, push and release the Self-Test switch until identification number 05 appears in the 'Match/Ball in Play' window. Hold in the Credit button until the desired number of Service Credits (up to five) appears on the player score displays.

NOTE: If, upon accessing identification number 05, a number of credits greater than five is displayed, pressing the credit button has no effect.

Identification number 15 is reserved as a record of the number of Service Credits used.

\*The 10,000 level is pre-set at the factory; can be set to zero, initially, if desired.

\*\*If Coin Chute is not used in game, number displayed (if other than 00) on Player Score displays has no significance.

NOTE: If "Total Play" register is reset to zeroes then "Total Replays" register should also be reset to zeroes to maintain the game percentage value.

#### **A. ABCD FEATURE: FEATURE OPERATION & SCORING**

Making A & B top rollovers, top arrow lites alternate to score 25,000 points.

Making A-B-C & D rollovers, drops one or two drop targets from 7 bank (depending on SW. #8 setting) and lites the right lane lite for 20K 1st time, 40K 2nd, 60K 3rd & so on.

A-B-C-D also flashes the bumper for 3000 points when made in this sequence. 1st time left bumper, 2nd time right bumper, 3rd time bottom bumper. Bumper flashing will reset after each ball.

#### **B. SAUCER FEATURE**

Saucer scores top Right lane SPL W/L and scores 500 or 7000 points for each lit ball on pool table, plus super bonuses of 56K and 112K timer multipliers (depending on SW.#16 setting)

#### **C. INLINE DROP & BANK SHOT TARGET FEATURE**

1st target down 5000 points awarded and 2X lites.

2nd target down 10,000 points awarded and 3X lites.

3rd target down 15,000 points awarded and 4X lites.

4th target down 20,000 points awarded and 5X lites.

Bank shot 1st time hit scores 50,000 points, 2nd time (1 replay), bank shot values ALT or after SPL is made, will camp on 50,000 points (depending on SW. #24 setting)

#### **D. NO RECALL ON MULTIPLIERS**

#### **E. SINGLE DROP TARGET FEATURE**

It scores 500 points if no right lane lite is lit, or will score the lite value and will advance it to next higher value. When target is down, it will not come back up until ball is ejected thru saucer and come thru either lane A or B.

#### **F. ROLL OVER BUTTON FEATURE**

Rollover button scores as follows:

500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000, SPL, and then will camp on 70,000 Pts. Or will score 500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000 Pts. and will stay on 70,000 after this sequence is completed, on next ball will score 500, 10,000, 30,000, 50,000, 70,000, SPL, and will camp back on 70,000 Pts. (depending on SW. #14 setting).

#### **G. 7 BANK DROP & DELUXE TARGETS FEATURE**

Knocking 1 thru 7 or 9 thru 15 targets, single target 8 ball will flash. 2000 points for each target and 3000 points for each deluxe target is awarded when hit. Deluxe lites will not come on until 8 ball target is made. When 8 ball is made, deluxe lites will flash few times and will stay lit. By knocking the deluxe lites, 1st time 50,000 points will be awarded and deluxe SPL will lite, or 7 targets will reset (depending on SW. #23 setting)

Two more SWITCHES are involved with deluxe feature:

SW. #21 can recall or reset the deluxe lites after each ball.

SW. #22 can advance the deluxe lites on backbox on any time deluxe on playfield is made or only when playfield SPL deluxe is made.

SW. #24 is also provided for deluxe feature on playfield to score as follows:

See page 7 for deluxe 50K or special lite adjustment.

#### **H. OUTLANE SPECIAL FEATURE**

When right lane values are advanced all the way to top, the outlanes will lite to alternate for SPL.



### I. 8 BALL SPL FEATURE

Could be turned on with 56K, and 112K bonus or with 112K bonus only.

### J. LEFT & RIGHT LANE STROBE LITES FEATURE

When ball rolls on left lane or hits single drop target or hits inline targets, the lites on both lanes will be strobing and they will reset on outhole.

### K. BACK BOX DELUXE FEATURE

Whenever all 6 deluxe lites on backbox are made game will award from 0 to 3 replays. Backbox deluxe lites will not reset until all are made.

#### BACKBOX DELUXE FEATURE

No Award  
One Credit  
Two Credits  
Three Credits

SELF TEST POSITION 22 ← 22  
SET TO "00"  
SET TO "01"  
SET TO "02"  
SET TO "03"

### L. SPECIAL REPLAY/X-BALL/NOVELTY MODES

Self test positions 16 and 17 give the operator flexibility to award a replay ball or score (Novelty) when a special is scored. A combination of X/Ball, Novelty can be obtained through the following chart.

	Set to "03"	Set to "02"	Set to "01"
	Award	Award	Award
16 → Self test position 16 playfield X-Balls and Specials			
8 Ball Special	Replay	X-Ball*	50,000
Deluxe Special	Replay	X-Ball*	50,000
Saucer Special	Replay	X-Ball*	50,000
Left or right out Special	Replay	X-Ball*	50,000
Inline target special	Replay	X-Ball*	50,000
Left lane Special	Replay	X-Ball*	50,000
Left lane X-Ball	X-Ball	X-Ball**	25,000
Self -test position 17			
Scoring Thresholds	Set to "03"	Set to "02"	Set to "01"
	Award	Award	Award
	Replay	X-Ball**	No Award

(\*) 50,000 if same player shoot again is lit.

(\*\*) 25,000 if same player shoot again is lit.

*Self test position 20-21 → Jamais Trouver  
Dans Le Capier  
mis à zero*

## V. GAME ADJUSTMENTS

### A. Playfield Panel Post Adjustments:

Posts that control left and right outlane opening on panel can be removed to make access to outlanes easier or harder for ball to enter. See Figure II.

Easier entry will decrease playing time and scoring (conservative).

Harder entry will increase playing time and scoring (liberal).

### B. Back Box Game Adjustments:

Each game has thirty-two switches located on A4, the MPU module, located in the back box, that allow play to be customized to the location. See Figure III. Credits per coin, maximum credits, credit display, balls per game, match feature, high game feature, special award and melody are selectable by means of the switches. The switches are contained in four sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The "ON" toggle position is marked on the assembly. **Turn off power before making adjustments.**

#### Credits/Coin Adjustments:

The credits per coin are selectable by means of S17-S20 for coin chute #2 (Center). The switch settings and resultant credits/coin are as follows:

S20	S19	S18	S17	Credits/Coin	S20	S19	S18	S17	Credits/Coin
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings	ON	OFF	OFF	OFF	8/1 Coin
OFF	OFF	OFF	ON	1/1 Coin	ON	OFF	OFF	ON	9/1 Coin
OFF	OFF	ON	OFF	2/1 Coin	ON	OFF	ON	OFF	10/1 Coin
OFF	OFF	ON	ON	3/1 Coin	ON	OFF	ON	ON	11/1 Coin
OFF	ON	OFF	OFF	4/1 Coin	ON	ON	OFF	OFF	12/1 Coin
OFF	ON	OFF	ON	5/1 Coin	ON	ON	OFF	ON	13/1 Coin
OFF	ON	ON	OFF	6/1 Coin	ON	ON	ON	OFF	14/1 Coin
OFF	ON	ON	ON	7/1 Coin	ON	ON	ON	ON	15/1 Coin

The credits given are selectable by means of switches 1-5 incl., for coin chute #1 and switches 9-13 incl., for coin chute #3. Thirty-one different credit ratios are available for each coin chute. The switch settings and resultant credits/coin are listed below.

#### CREDITS/COIN ADJUSTMENTS

COIN CHUTE	SWITCHES					CREDITS	CREDITS	CREDITS	CREDITS	CREDITS	TOTAL CREDITS/COINS
#1 (HINGE SIDE) OR #3 (RIGHT SIDE)	5	4	3	2	1						
	13	12	11	10	9						
OFF	OFF	OFF	OFF	OFF	OFF	1/1 Coin					
OFF	OFF	OFF	OFF	ON	ON	2/1 Coin					
OFF	OFF	OFF	ON	OFF	OFF	3/1 Coin					
OFF	OFF	OFF	ON	ON	ON	4/1 Coin					
OFF	OFF	ON	OFF	OFF	OFF	5/1 Coin					
OFF	OFF	ON	OFF	ON	ON	6/1 Coin					
OFF	OFF	ON	ON	OFF	OFF	7/1 Coin					
OFF	OFF	ON	ON	ON	ON	8/1 Coin					
OFF	ON	OFF	OFF	OFF	OFF	9/1 Coin					
OFF	ON	OFF	OFF	ON	ON	12/1 Coin					
OFF	ON	OFF	ON	OFF	OFF	14/1 Coin					
OFF	ON	OFF	ON	ON	ON	1/2 Coins*					
OFF	ON	ON	OFF	OFF	OFF	2/2 Coins*					
OFF	ON	ON	OFF	ON	ON	3/2 Coins*					
OFF	ON	ON	ON	OFF	OFF	4/2 Coins*					
OFF	ON	ON	ON	ON	ON	5/2 Coins*					
ON	OFF	OFF	OFF	OFF	OFF	6/2 Coins*					
ON	OFF	OFF	OFF	ON	ON	7/2 Coins*					
ON	OFF	OFF	ON	OFF	OFF	8/2 Coins*					
ON	OFF	OFF	ON	ON	ON	9/2 Coins*					
ON	OFF	ON	OFF	OFF	OFF	12/2 Coins*					
ON	OFF	ON	OFF	ON	ON	14/2 Coins*					
ON	OFF	ON	ON	OFF	OFF	1/1st Coin	2/2nd Coin				3/2
ON	OFF	ON	ON	ON	ON	0/1st Coin*	1/2nd Coin	1/3rd Coin	1/4th Coin		3/4
ON	ON	OFF	OFF	OFF	OFF	0/1st Coin*	1/2nd Coin	0/3rd Coin**	2/4th Coin		3/4
ON	ON	OFF	OFF	ON	ON	1/1st Coin	1/2nd Coin	1/3rd Coin	2/4th Coin		5/4
ON	ON	OFF	ON	OFF	OFF	1/1st Coin	2/2nd Coin	1/3rd Coin	3/4th Coin		7/4
ON	ON	OFF	ON	ON	ON	1/1st Coin	2/2nd Coin	2/3rd Coin	2/4th Coin		7/4
ON	ON	ON	OFF	OFF	OFF	0/1st Coin***	0/2nd Coin***	1/3rd Coin			1/3
ON	ON	ON	OFF	ON	ON	0/1st Coin**	0/2nd Coin**	0/3rd Coin**	1/4th Coin		1/4
ON	ON	ON	ON	OFF	OFF	0/1st Coin***	0/2nd Coin***	0/3rd Coin***	0/4th Coin****	1/5th Coin	1/5
ON	ON	ON	ON	ON	ON	0/1st Coin***	0/2nd Coin***	1/3rd Coin	0/4th Coin****	1/5th Coin	2/5

\*No Credits until 2nd coin is dropped.

\*\*No Credits until 4th coin is dropped.

\*\*\*No Credits until 3rd coin is dropped.

\*\*\*\*No Credits until 5th coin is dropped.

### MAXIMUM CREDITS:

The maximum credits accepted by the machine limits the number of games that can be accumulated by coining, by winning replays or both. The maximum number of credits is selectable by means of switches 25 and 26. Four credit limits are available. Switch settings are listed below.

#### MAXIMUM CREDITS

10  
15  
25  
40

#### SWITCHES

26	25
OFF	OFF
OFF	ON
ON	OFF
ON	ON

### BALLS PER GAME:

#### # BALLS /GAME

5  
4  
3  
2

#### SWITCHES

32	31
OFF	ON
ON	OFF
OFF	OFF
ON	ON

### MATCH FEATURE:

When the Match Feature is ON, a random number appears on the Match/Ball in Play window and the word Match is illuminated. If the number matches the tens digit in a player's score, a free game is awarded. The Match Feature creates an incentive to play.

#### MATCH

ON  
OFF

#### SWITCH 28

ON  
OFF

### CREDIT DISPLAY:

#### CREDITS DISPLAYED

YES  
NO

#### SWITCH 27

ON  
OFF

### HIGH SCORE FEATURE:

The game is designed to award an Extra Ball or Free Game at each of the two or three score levels. See Front Door Game Adjustments.

#### AWARD

REPLAY  
EXTRA BALL  
NOVELTY  
NO AWARD

#### SELF TEST POSITION 16

SET TO "03"  
SET TO "02"  
SET TO "01"  
SET TO "00"

#### SELF TEST POSITION 17

SET TO "03"  
SET TO "02"  
SET TO "01"  
SET TO "00"

For combinations of replay/X-ball/Novelty Modes see page 4A "K. Special Replay/X-ball/Novelty Modes"

### HIGH SCORE TO DATE OR OVER 10,000,000 SCORE FEATURE:

The game is designed to award free games as an option if high score to date is beat or player exceeds 10,000,000 points. Each time this happens, the winning score becomes the new high score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play. Recommended setting is underlined.

#### HIGH SCORE TO DATE FEATURE

No Award  
One Credit  
Two Credits  
Three Credits

#### SELF TEST POSITION 19

SET TO "00"  
SET TO "01"  
SET TO "02"  
SET TO "03"

State and local laws may regulate the use of the above features, and they have been designed to allow for appropriate adjustment in order to conform to such requirements.

## SOUND OPTION

The game is designed to make several tones and noises to announce power-up, game-up, etc. The tones are intended to attract attention to the game and increase game usage. The tones are controlled by pressing self test button until the #18 shows on the match/ball in play display. Now pulse replay button to desired sound setting.

Setting "00"

Most switches associated chimes without feature background.

Setting "01"

Playfield switches associated chimes with background.

Setting "02"

Most scoring will have noise effect without background.

Setting "03"

Most all scoring will have a noise effect with background.

## GAME FEATURE OPTIONS:

Inline target 50K or special lite adjustment:

Liberal	SW. 6 ON	50K and special lites alternate.
Conservative	SW. 6 OFF	Only 1 special per ball.

C and D rollover lane lite adjustment:

Liberal	SW. 7 ON	Making C or D lane puts both lites out.
Conservative	SW. 7 OFF	Making C or D lane only puts that lane lite out.

A, B, C, D rollover lane 7 drop target adjustment:

Liberal	SW. 8 ON	Completing A, B, C, D rollover drops 2 targets down.
Conservative	SW. 8 OFF	Completing A, B, C, D rollover drops 1 target down.

Left lane feature step up lite adjustment:

Liberal	SW. 14 OFF	Lite sequence, no lite, 10K, 30K, 50K, X-Ball, 70K, SPEC., 70K and 70K stays on
Conservative	SW. 14 OFF	First ball sequence, no lite, 10K, 30K, 50K, X-Ball, 70K and 70K stays On. Next ball sequence, no lite, 10K, 30K, 50K, 70K, SPECIAL 70K and 70K stays On.

8 Ball Special lite adjustment:

Liberal	SW. 15 ON	Completing 8-Ball 2nd and 3rd time scores 1 replay each.
Conservative	SW. 15 OFF	Completing 8-Ball 3rd time scores 1 replay.

Saucer hole scoring adjustment:

Liberal	SW. 16 ON	Saucer scores rack and bonus values plus any lit 2X, 3X, 4X or 5X.
Conservative	SW. 16 OFF	Saucer scores rack and bonus values only.

Panel D-E-L-U-X-E lite next ball adjustment:

Liberal	SW. 21 ON	Any D-E-L-U-X-E lite out will not come on after completion of 8-Ball for next ball.
Conservative	SW. 21 OFF	Any D-E-L-U-X-E lite out will come back on after completion of 8-Ball for next ball.

Back Box D-E-L-U-X-E lite advance adjustment:

Liberal	SW. 22 ON	Completing playfield D-E-L-U-X-E advances back D-E-L-U-X-E 1 step each time.
Conservative	SW. 22 OFF	Completing playfield D-E-L-U-X-E advances back D-E-L-U-X-E only when special is lit.

Panel D-E-L-U-X-E 7 drop target reset adjustment:

Liberal	SW. 23 ON	Completing 8-Ball and Deluxe does not reset 7 drop targets until outhole.
Conservative	SW. 23 OFF	Completing 8-Ball and D-E-L-U-X-E will reset targets.

## DELUXE 50K OR SPECIAL LITE ADJUSTMENT:

Liberal	SW. 24, 6 ON	Lites Special, 50K, Special, 50K.
Medium	SW. 24 OFF, 6 ON	Lites 50K, Special, 50K, Special.*
Semi-Medium	SW. 24 ON, 6 OFF	Lites Special, 50K, 50K, 50K.
Conservative	SW. 24, 6 OFF	Lites 50K, Special 50K, 50K.

Number of games replays per game adjustment:

Liberal	SW. 29 ON	All replays earned will be collected.
Conservative	SW. 29 OFF	Only 1 replay per player per game.

Game Over Attract Adjustment:

SW. 30 ON	Voice says "Quit talking and start chalking"
	"8-Ball Deluxe."
SW. 30 OFF	No Voice

## C. FRONT DOOR GAME ADJUSTMENTS

### High Score Feature Adjustments:

The game is designed to award an extra ball (option) or a free game at each of three score levels. The recommended levels are on the score card in the game.

Any level from 10,000 to 9,999,000 can be set, as desired. It is also possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button (See Figure III) at one second intervals approximately six times or until identification number 01 appears on the 'Match/Ball in Play' display.
2. The number on the Player Score Displays is the score level.\* It can be increased, if desired, by holding the credit button in. To decrease the score level, hold the credit button in and depress and release the Self-Test button. Release the credit button when the desired number appears. Note that the level changes 10,000 points at a time. If the number '00' is left on the displays, the high score feature is eliminated for that level.
3. Repeat steps 1 and 2 for the second and third score levels. The identification numbers '02' and '03' on the Match/Ball in Play display are for the second and third levels, respectively.

### High Score to Date and 10,000,000 Feature:

The game is designed to award free games when 'High Score to Date' is beat, or if the player exceeds 10,000,000 points.

It is recommended that the level, which will build with play, be periodically reset to the factory recommended level to encourage game play. The adjustment procedure is the same as for the High Score Feature Adjustment, Steps 1 and 2. Continue pushing the Self-Test button until the identification number '04' appears on the 'Match/Ball in Play' display and then do Step 2.

Any level from '00' to 9,990,000 can be set as described. It is to be noted that '00' does NOT turn off the feature, as it does on High Score feature. The feature is turned off by self test position 19 as discussed under 'Back Box Game Adjustments.'

### SELF TEST SETUP FOR 16-22:

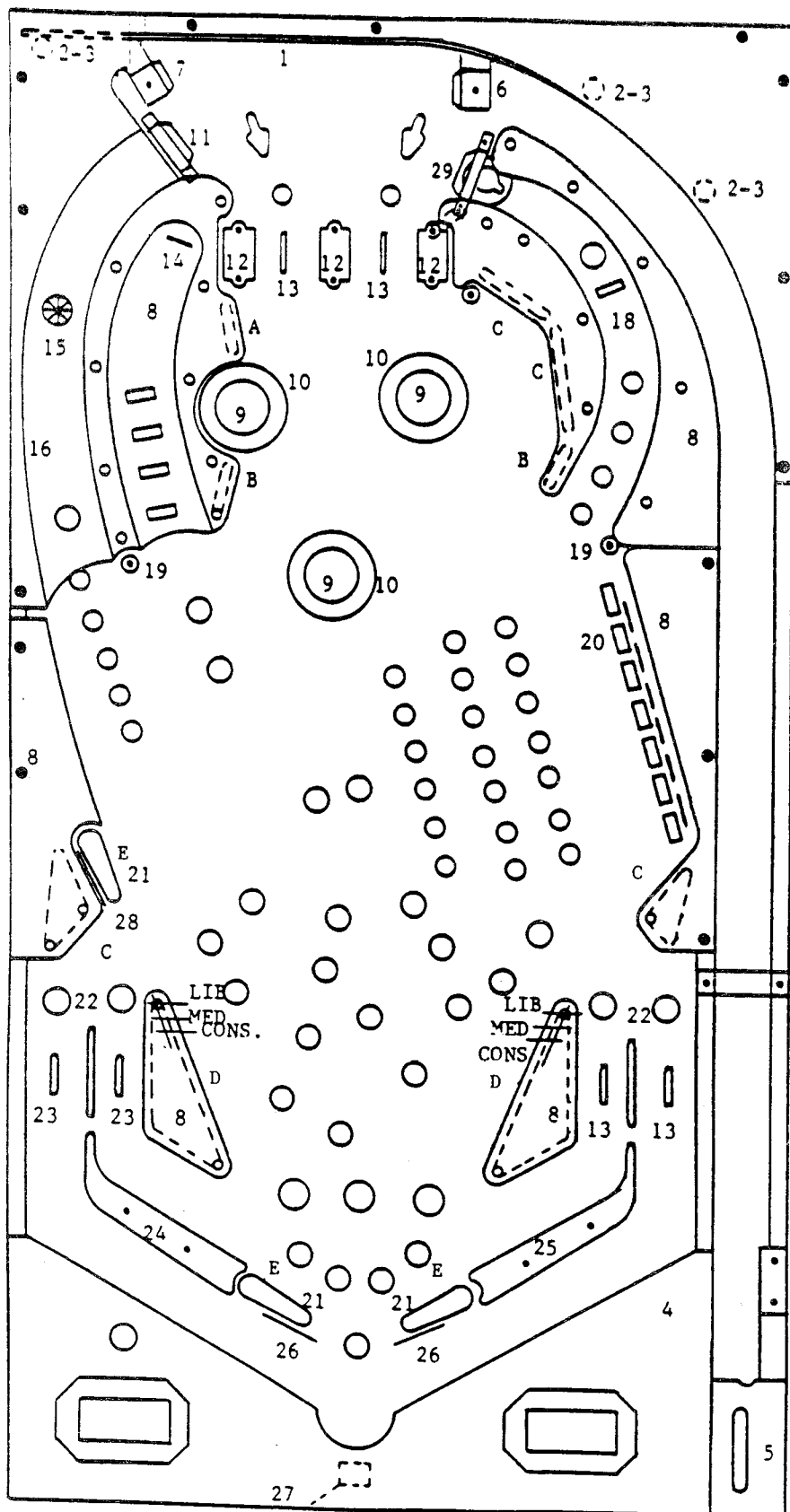
To set up positions 16-22 push and release self test button till 16 shows on match/ball in play. Now pulse replay button for recommended setup from "00" thru "03." Repeat for positions 17, 18, 19 or 22. Positions 20, 21 setups go from "00" thru "15."

### SOUND

In addition to individual volume controls for speech and other game sounds on the Squawk and Talk Board. There is also a Master Volume Control located on the front door. (refer to page 10)

Please note that these module volume controls should be adjusted prior to setting the control on the front door.

\*Can be quickly set to '00' by pressing S33 on the MPU assembly in the back box or Coin Chute switch #3. (See Figure III).



## RUBBER PARTS

A. R-521	3/4" DIA.	(1)
B. R-521-1	1" DIA.	(2)
C. R-521-2	1 1/2" DIA.	(4)
D. R-521-4	2 1/2" DIA.	(2)
E. R-533-3	FLIPPER	(3)
F. R-243	5/16" DIA.	(10)

## PANEL TOP PARTS

1. Arch Rail	M-1774-6	
2. Rail Post	C-907	(3)
3. Rail Post Cap	C-908	(3)
4. Bottom Arch	P-5871-84	
5. Shooter Gauge	P-6359-45	
6. Ball Gate, (R)	A-1475-13	
7. Ball Gate (L)	A-1475-12	
8. Screened Plastics (Set)	A-2890-151	
9. Thumper Cap	A-4009-1	(3)
10. Thumper Cap Collar	A-4011-1	(3)
11. Ball Gate	ASE-2250-27	
12. Plastic Ball Guide (Blue)	C-935-2	(3)
13. Rollover Wire & Brkt.	ASE-2806	(4)
14. Target & Switch Assy.	ASE-2911-3	
15. Rollover Button	C-900	
16. Ball Guide Assy.	A-3032-69	
17. (4) Inline Target Assy.	ASE-2993-12	
18. (1) Inline Target Assy.	ASE-2993-5	
19. Minipost & Rubber	ASE-2836-2	(3)
20. (7) Drop target Assy./Memory	ASE-3038-3	
21. Flipper & Shaft Assy.	ASE-2214-21	(3)
22. Ball Guide Wire	M-121-27	(2)
23. Rollover Wire & Bracket	ASE-2806-1	(2)
24. Ball Guide Assy. (L)	A-2898-39	
25. Ball Guide Assy. (R)	A-2898-38	
26. Buffer Wire	M-121-53	(2)
27. Ball Return Wire & Brkt. Clear Plastics (Set)	ASE-2806-21	
(Not Shown)	A-2890-152	
28. Ball Guide Wire	M-121-93	
29. Ball Gate Assy.	ASE-2250-85	

LIB. - LIBERAL  
 MED. - MEDIUM  
 CONS. - CONSERVATIVE

INDICATES MOVABLE POSTS  
 FOR SCORING ADJUSTMENTS

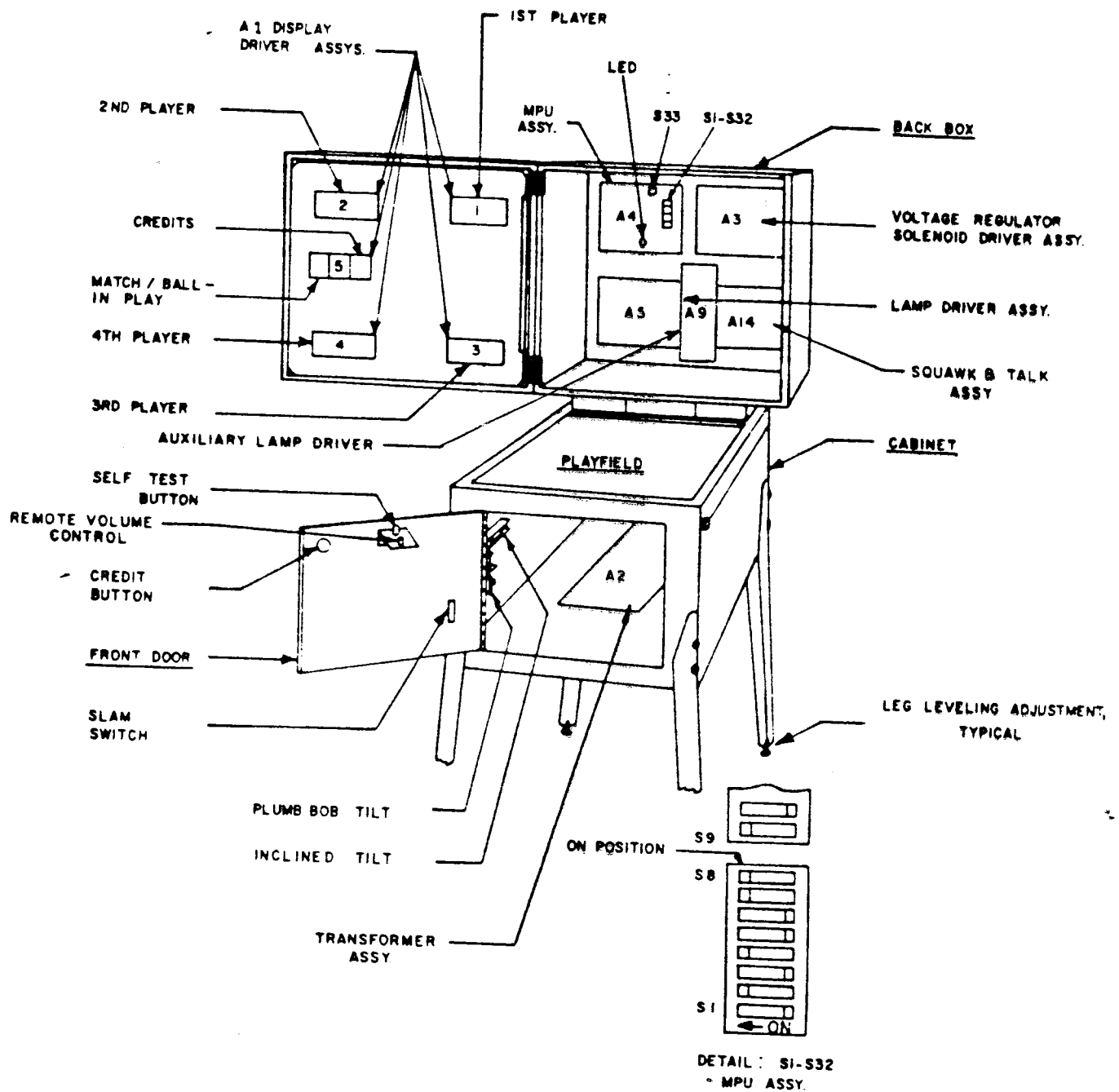


FIGURE III. ELECTRONIC PIN BALL MACHINE

## RECOMMENDED

Instruction, Score Cards and High Score Feature Settings  
to be used on **EIGHT BALL DELUXE**

### REPLAYS                      3-BALL

Instruction Card	M-1508-98-E
Score Card	M-1508-98-B
1 Replay at 600,000	
1 Replay at 1,100,000	

### REPLAYS                      5-BALL

Instruction Card	M-1508-98-E
Score Card	M-1508-98-A
1 Replay at 1,000,000	
1 Replay at 2,000,000	

### EXTRA BALL

Instruction Card	M-1508-98-F
Score Card	M-1508-98-A W/NN-1
1 Extra Ball at 1,000,000	
1 Extra Ball at 1,600,000	

## ADDITIONAL CARDS

### REPLAYS

M-1508-H-1	400,000	950,000
M-1508-I-1	450,000	1,000,000
M-1508-J-1	500,000	1,000,000
M-1508-K-1	500,000	1,100,000
M-1508-L-1	550,000	1,100,000
M-1508-M-1	600,000	1,100,000
M-1508-N-1	650,000	1,200,000
M-1508-O-1	700,000	1,200,000
M-1508-P-1	700,000	1,400,000
M-1508-Q-1	800,000	1,400,000
M-1508-R-1	900,000	1,400,000
M-1508-S-1	900,000	1,500,000
M-1508-T-1	1,000,000	1,500,000
M-1508-U-1	1,000,000	1,600,000
M-1508-V-1	1,000,000	1,800,000
M-1508-W-1	1,000,000	2,000,000
M-1508-X-1	1,100,000	1,800,000
M-1508-Y-1	1,100,000	2,000,000
M-1508-FF-1	1,200,000	2,000,000
M-1508-GG-1	1,300,000	2,000,000
M-1508-HH-1	1,400,000	2,100,000
M-1508-II-1	1,400,000	2,200,000

### EXTRA BALL

M-1508-NN-1	1,000,000	1,600,000
M-1508-OO-1	1,000,000	2,000,000
M-1508-PP-1	1,200,000	2,200,000
M-1508-QQ-1	1,400,000	2,400,000

Instruction Card, Novelty  
M-1508-98-G

### BLANKS (3)

High game to date recommended levels;  
(reset periodically)  
3 BALL 1,300,000  
5 BALL 2,200,000



## RECOMMENDED SETTINGS

### RECOMMENDED REPLAY GAME SETTING FOR:

INLINE TARGET 50K OR SPECIAL  
 C AND D ROLLOVER LITE  
 A,B,C,D ROLLOVER 7 DROP TARGET  
 LEFT LANE FEATURE STEP UP LITE  
 8 BALL SPECIAL LITE  
 SAUCER HOLE SCORING  
 PANEL DELUXE LITE NEXT BALL  
 BACK BOX DELUXE LITE ADVANCE  
 PANEL DELUXE 7 DROP TARGET RESET  
 DELUXE 50K OR SPECIAL (See Page 7)  
 NUMBER OF REPLAYS PER GAME  
 GAME OVER ATTRACT  
 BALLS PER GAME  
 BALLS PER GAME

#### REPLAY

Instruction Card  
 Score Card  
 Major Mode

Match  
 High Score to Date

#### X-BALL

Instruction Card  
 Score Card  
 Major Mode

Match  
 High Score to Date

#### NOVELTY

Instruction Card  
 Major Mode

Match  
 High Score to Date

#### 3-BALL

M-1508-98-E  
 M-1508-98-B  
 Self Test Position 16, 17  
 Set to "03"  
 SW. 28 ON  
 Self Test Position 19  
 Set to "03"

M-1508-98-G  
 Self Test Position 16, 17  
 Set to "01"  
 SW. 28 OFF  
 Self Test Position 19  
 Set to "00"

	3-BALL	5-BALL
SW. 6	ON	ON
SW. 7	ON	OFF
SW. 8	ON	ON
SW. 14	ON	ON
SW. 15	ON	OFF
SW. 16	ON	ON
SW. 21	ON	OFF
SW. 22	ON	ON
SW. 23	ON	ON
SW. 24	ON	OFF
SW. 29	ON	ON
SW. 30	ON	ON
SW. 31	OFF	ON
SW. 32	OFF	OFF

#### 5-BALL

M-1508-98-E  
 M-1508-98-A  
 Self Test Position 16, 17  
 Set to "03"  
 SW. 28 ON  
 Self Test Position 19  
 Set to "03"

M-1508-98-E  
 M-1508-98-A W/NN-1  
 Self Test Position 16, 17  
 Set to "02"  
 SW. 28 OFF  
 Self Test Position 19  
 Set to "00"

M-1508-98-G  
 Self Test Position 16, 17  
 Set to "01"  
 SW. 28 OFF  
 Self Test Position 19  
 Set to "00"

## VIII. ROUTINE MAINTENANCE ON LOCATION:

Self-Test routines are written into the game design. They are particularly useful for routine maintenance. The tests are described below. The first test is automatic and occurs on power-up. This test causes the MPU module A4 to examine itself for failures. Seven flashes of an LED indicates proper operation. The second series of self-diagnostic tests causes the MPU to 'exercise' each of the other modules in such a way as to make their faults, if any, obvious. See Figure III and Page ii.

It is recommended that these tests be used several times a week to check out the games before play. If faults are discovered, they may be corrected on location if the operator has a stock of replacement modules. See "Trouble Shooting on Location."

### **MPU Module Self-Test:**

At power on, the LED on the MPU module flashes once. (Flicker-Flash). After a pause, it flashes six more times and goes out. A power-up tune is played to announce game readiness. This indicates proper MPU operating condition and successful completion of the power-up test.

### **Game Self-Diagnostic Tests:**

1. Pressing the Self-Test button inside the door initiates the Self-Test routine. See Figures III and IV. All switched lamps flash off and on continuously.
2. Pressing the Self-Test button again causes each digit on each display to cycle from 0 thru 9, and repeat continuously.
3. Pressing the Self-Test button again causes each solenoid to be energized, one at a time, in a continuous sequence. Hold both flipper buttons 'in' during this test. The number appearing on the Player Score displays is the same as the number assigned to the solenoid. The sound of a solenoid pulling-in as a number appears indicates proper operation. The absence of sound is improper. If sound is absent, see Page 17 for help in Solenoid identification.
4. Pressing Self-Test button again causes the sound module to play the "Game Over" tune repeatedly.
5. Pressing the Self-Test button again causes the MPU to search each switch assembly for stuck contacts. If any are found, the number of the first set encountered is flashed on the Player Score displays. The number remains until the fault is cleared. See Page 17 for help in Stuck Switch identification. Other numbers may follow if more stuck contacts are present. If there are no stuck switches, the Match/Ball in Play display flashes '0'.
6. Pressing the Self-Test button 23 more times causes the MPU to step thru the threshold and bookkeeping functions described previously and finally to repeat the power-up test. For more rapid exit to power-up, turn the game off, then on. The game is now ready to play.

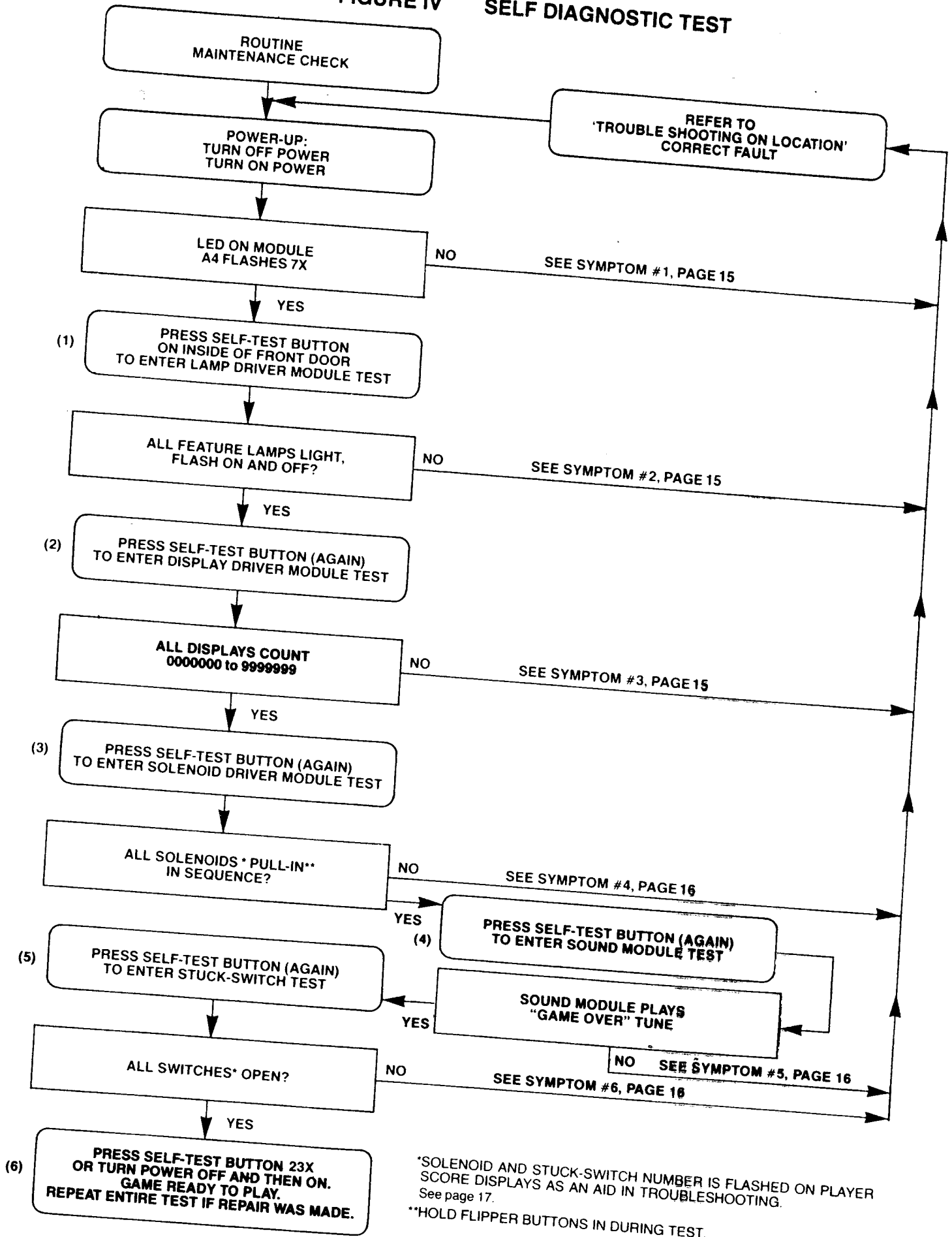
After successful completion of the Self Diagnostic Test procedure, set the game up for play. Exercise each rollover, thumper-bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no response, clean contacts by gently closing them on a clean business card or piece of paper and wiping until they wipe clean. Regap, if necessary, to 1/16". **Do not burnish or file Gold Plated Switch Contacts.**

## IX. TROUBLESHOOTING ON LOCATION

The game is designed to make troubleshooting easy. Several simple procedures are given herein that cover the greatest percentage of game failures. They are written for an operator on location and require module replacement. (See Figure III) Symptoms and the action to be taken are given for each type of problem.

If the problem is more complicated and is not solved by following this procedure, more detailed procedures are available from Bally. See the Parts List for ordering information.

# FIGURE IV SELF DIAGNOSTIC TEST



\*SOLENOID AND STUCK-SWITCH NUMBER IS FLASHED ON PLAYER SCORE DISPLAYS AS AN AID IN TROUBLESHOOTING.  
See page 17.

\*\*HOLD FLIPPER BUTTONS IN DURING TEST.

- 1A) SYMPTOM:** Game does not play power-up tune when power is turned on. General Illumination is present.
- ACTION:**
- A)** Turn power OFF. Open back box. Locate light emitting diode (LED) on MPU module A4.
  - B)** Turn Power ON. LED must flash 7X to indicate that module A4 is good. Correct flash sequence is flicker/flash-pause-and then six more flashes and LED goes out.
  - C.** If LED does not come on, or does not flash, or flashes, but less than 7X, turn off power. Replace MPU module A4.
- CAUTION:** **Replacement MPU Module must have same Part Number or incorrect operation will result! See Parts List for MPU Module Part Number.**
- Turn power ON.
- D)** If game is correct, it is now ready for play. If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 2A) SYMPTOM:** Not all feature lamps light during game play.
- ACTION:**
- A)** With power ON, open front door. Press button (Self-Test switch) once. If the game is correct, **all** feature lamps flash ON and OFF.
  - B)** Carefully raise playfield or open back box to gain access to lamps.
  - C)** Replace bulbs that do not flash.
  - D)** If game is correct, it is now ready for play.
  - E)** If game is not correct, turn power OFF. Replace Lamp Driver Module A5. Turn power ON and repeat A.
  - F)** If game is correct, it is now ready for play.\*
  - G)** If game is not correct, turn power OFF. Replace MPU module A4. See CAUTION. 1C. Turn power ON and repeat A.
  - H)** If game is correct, it is now ready for play.\* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 2B) SYMPTOM:** One or some switched lamps always ON.
- ACTION:** Repeat 2AA, AB, AE, and AF and, if necessary AG & AH.
- 3A) SYMPTOM:** Display digits improper on **one** or **several**, but less than all Display Driver module(s). A1. Improper: One or several segments always OFF, digits mottled or several segments or digit(s) always ON.
- ACTION:**
- A)** With power ON, open front door. Press button (Self-Test switch) twice. If the game is correct, each digit on each Display Driver Module A1 (5 used/game) displays the count 1-9 and 0 continuously in all 6 digit positions. Note defective Display Driver modules.
  - B)** Turn power OFF.
- CAUTION: High Voltage is supplied to the Display Driver Modules, A1, from the Solenoid Driver/Voltage Regulator Module A3. Wait 30 seconds for High Voltage to Bleed Off.**
- C)** Replace Display Driver module(s) A1. Turn power ON. Repeat A.
  - D)** If game is correct, it is now ready to play.\* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 3B) SYMPTOM:** All displays improper (all five display Driver modules). Improper: Digit(s) always on or off/segment(s) always on or off, all displays.
- ACTION:**
- A)** Repeat 3AA, and AB.
  - B)** Replace MPU module A4. See CAUTION NOTE, 1C. Turn power ON. Repeat A.

- C) If game is correct, it is now ready to play.\* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 3C) **SYMPTON:** One or several displays always off.  
**ACTION:** A) Do 3AA, AB, AC, and AD.  
 B) Repeat 3BB and BC, if necessary.
- 4A) **SYMPTOM:** Solenoid(s) do(es) not pull-in during course of game.  
**ACTION:** A) With power ON, open front door. Press button (Self-Test switch) three times.  
 B) If game was correct, each solenoid would be energized. A number is flashed on the Player Score displays as each solenoid is pulsed. Note any numbers that do not have the sound of a solenoid associated. See Solenoid Identification Table, Page 17 and Figure V.  
 C) Carefully lift the playfield (or open the back box) to gain access to the solenoid. Turn power OFF. Inspect the solenoid.  
 D) If a lead is broken off, repair. Repeat A & B. If game is correct, it is now ready for play.\* If solenoid wiring was correct, turn power OFF.  
 E) Replace Solenoid Driver/Voltage Regulator module A3. See CAUTION NOTE 3AB.  
 F) Repeat AA & AB. If game is correct, it is now ready to play.\* If game is not correct, turn power OFF.  
 G) Replace Sound Module A8.  
 H) Repeat AA and AB if game is correct. It is now ready to play. If game is not correct, turn power OFF.  
 I) Replace MPU module A4. See CAUTION NOTE, 1C.  
 J) Repeat A & B. If game is correct, it is now ready to play.\* If game is not correct, refer to Module Replacement Procedure. (See Parts List.)
- 4B) **SYMPTOM:** Solenoid(s) always energized—Note: if impulse solenoids (ball ejects, slingshots, thumper-bumpers, etc.) are energized continuously, they are subject to damage. Limit troubleshooting to one minute with power ON, followed by **five minutes with power OFF**. Repeat as necessary. Replace damaged solenoids.  
**ACTION:** Do 4AA, AB, AE, AF, AG, AH and if necessary, AI and AJ.
- 5) **SYMPTOM:** No Sound.  
**ACTION:** A) With Power ON, open front door, press Self-Test switch four times.  
 B) Turn volume control clockwise to Max.  
 C) If correct, sound will be heard. If incorrect, try seating speaker lead connector (J2) and input connector (J1).  
 D) If correct, sound will be heard. If incorrect, refer to Module Replacement procedure."
- 6) **SYMPTOM:** Feature (Drop Targets, etc.) does not score.  
**ACTION:** A) With power ON, open front door. Press button (Self-Test switch) five times.  
 B) If the game is correct, Match/Ball in Play display would flash '0'. If a number appears on the Player Score displays, see Switch Assembly Identification Table, Page 17 and Figure V.  
 C) Carefully lift the playfield. Locate the switch assembly identified from the number. Visually inspect the switch assembly. If the contacts are 'stuck', regap them to 1/16". See section under ADJUSTMENTS. Repeat A & B. If the game is correct, it is now ready to play.\* If game is not correct, turn the power OFF.  
 D) Replace MPU module A4. See CAUTION NOTE 1, C.  
 E) Repeat A & B. If the game is correct, it is now ready to play.\* If the game is not correct, refer to Module Replacement Procedure. (See Parts List).
- 7) **SYMPTOM:** Game blows fuse(s) repeatedly.  
**ACTION:** See Module Replacement Procedure. F.O. 560

\*Turn power On-Off switch OFF and then ON.

## SOLENOID IDENTIFICATION TABLE

Self Test #	SOLENOID IDENTIFICATION
01	LEFT SLINGSHOT
02	RIGHT SLINGSHOT
03	KNOCKER
04	LEFT THUMPER BUMPER
05	RIGHT THUMPER BUMPER
06	BOTTOM THUMPER BUMPER
07	SINGLE DROP TARGET RESET
08	#1, 9 DROP TARGET (TOP)
09	#2, 10 DROP TARGET
10	#3, 11 DROP TARGET

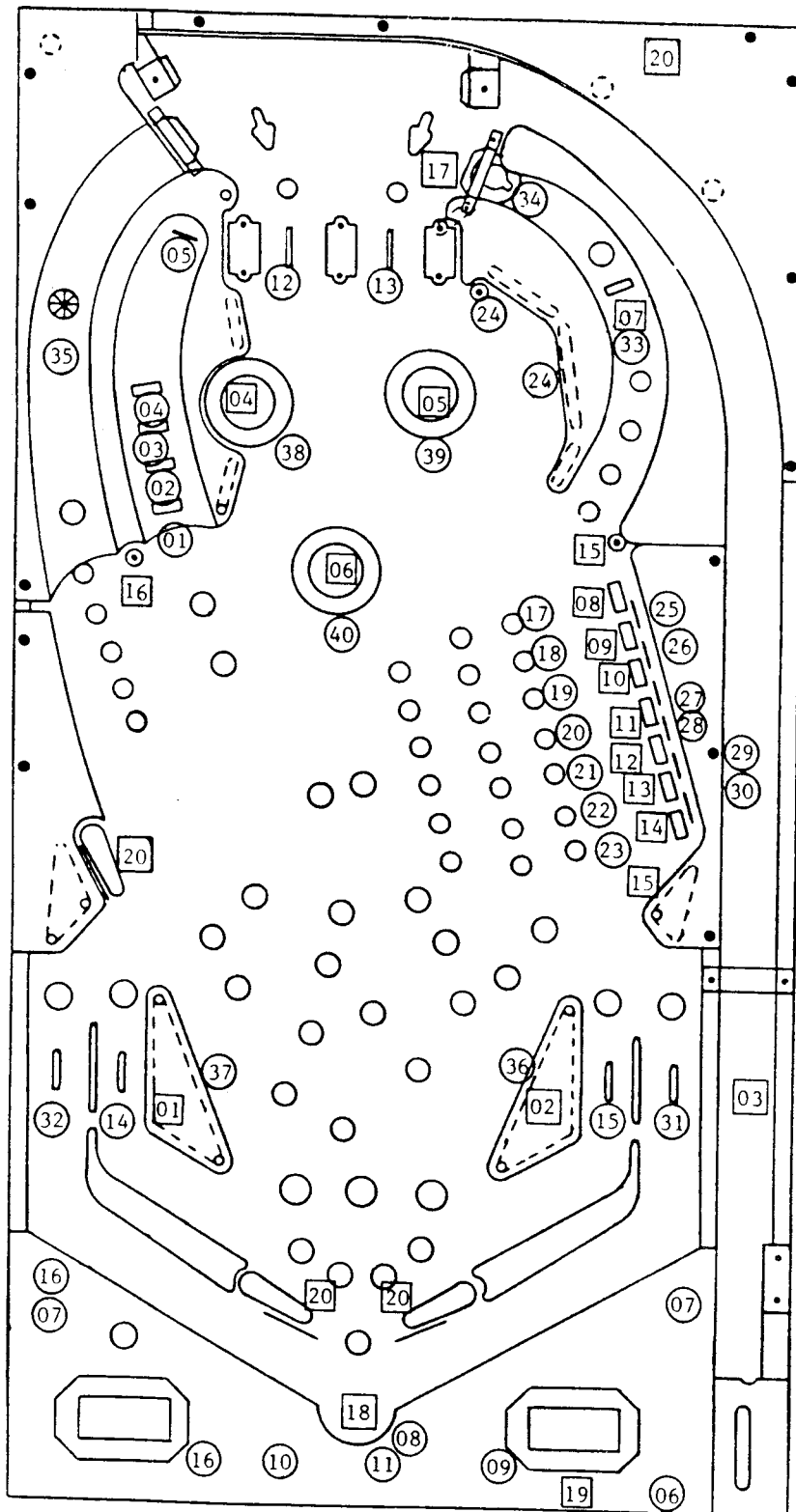
Self Test #	SOLENOID IDENTIFICATION
11	#4, 12 DROP TARGET
12	#5, 13 DROP TARGET
13	#6, 14 DROP TARGET
14	#7, 15 DROP TARGET (BOTTOM)
15	7 DROP TARGET RESET
16	4 DROP TARGET RESET
17	SAUCER
18	OUTHOLE KICKER
19	COIN LOCKOUT DOOR
20	KI RELAY (FLIPPER ENABLE)

## SWITCH ASSEMBLY SELF-TEST DISPLAY NUMBERS

Switch Self Test #	DESCRIPTION
01	2X INLINE DROP TARGET
02	3X INLINE DROP TARGET
03	4X INLINE DROP TARGET
04	5X INLINE DROP TARGET
05	INLINE BACK TARGET
06	CREDIT BUTTON
07	TILT (3)
08	OUTHOLE
09	COIN 111 (RIGHT)
10	COIN 1 (LEFT)
11	COIN 11 (MIDDLE)
12	"A" ROLLOVER
13	"B" ROLLOVER
14	"C" ROLLOVER
15	"D" ROLLOVER
16	SLAM (2)
17	1, 9 DROP TARGET
18	2, 10 DROP TARGET
19	3, 11 DROP TARGET
20	4, 12 DROP TARGET

Switch Self Test #	DESCRIPTION
21	5, 13 DROP TARGET
22	6, 14 DROP TARGET
23	7, 15 DROP TARGET
24	30 POINT REBOUND (2)
25	"D" TARGET
26	"E" FIRST TARGET
27	"L" TARGET
28	"U" TARGET
29	"X" TARGET
30	"E" 2ND TARGET
31	RIGHT OUTLANE
32	LEFT OUTLANE
33	SINGLE DROP TARGET
34	SAUCER
35	ROLLOVER BUTTON
36	RIGHT SLINGSHOT
37	LEFT SLINGSHOT
38	LEFT THUMPER BUMPER
39	RIGHT THUMPER BUMPER
40	BOTTOM THUMPER BUMPER

**NOTE:** SLINGSHOT & THUMPER BUMPER COILS  
WILL BE ENERGIZED WHEN SWITCH IS MADE.



○ INDICATES SWITCH ASSEMBLY  
IDENTIFICATION NUMBERS.  
NOTE: CABINET: 07, 16  
DOOR 06, 09  
10, 11, 16

□ INDICATES SOLENOID  
IDENTIFICATION NUMBERS.  
NOTE: DOOR: 19  
BACKBOX: 20  
CABINET: 03

FIGURE V

## ASSEMBLY ADJUSTMENTS:

### GENERAL:

All switch assemblies consist of leaf springs, contacts, separators, plastic tubing and screws to hold them to the mounting surface. Before attempting to adjust a switch assembly, make sure that these screws are tight. If not, tighten screw closest to the contact end of the leaf spring first. This will prevent the assembly from being secured in such a manner that the leaf springs tend to fan out. In general, all leaf springs are adjusted for a 1/16" gap in the open position and .010" overtravel or wipe in the closed position. All contacts should be in good condition. Unless otherwise instructed, they should be dry or non-lubricated. All contacts should be free of dust and dirt. Contacts, with the exception of the flipper button switch assemblies, are plated to resist corrosion. Filing or burnishing breaks the finish and encourages corrosion. Clean by closing the contacts over a clean piece of paper (e.g. a business card) and wiping gently until the contacts are clean. For the flipper button switch assemblies **ONLY**: Tarnish can be removed with a contact file followed by a burnishing tool. Severely pitted contacts must be replaced as an assembly. In general, contacts need be cleaned or replaced and adjusted only when they are found to be a source of game malfunction.

## X. SERVICE PARTS:

A parts catalogue is available upon request. The catalogue is illustrated and lists all replacement parts for each game manufactured by Bally. Requests should be addressed to:

BALLY MANUFACTURING CORPORATION  
2640 WEST BELMONT AVENUE  
CHICAGO, ILLINOIS 60618  
ATTN: PARTS DEPARTMENT

### SERVICE HINTS:

The Bally playfield has an improved tuff-coat finish with excellent wearing properties. Its life expectancy, as well as play appeal, can be extended by periodic cleaning of the playfield.

**DO:** Bally recommends you clean your playfield with Wildcat #125 (Wildcat Chemical Co., 1333 W. Seminary Drive, Ft. Worth, Texas 76115). Wildcat #125 is a combination cleaner and polish. Bally has tried and tested this product and found it to be very effective. If Wildcat #125 is not available, Bally suggests you ask your Distributor to order it. Inspect and hand polish the ball in a clean cloth. A chipped ball must be replaced. It can ruin the finish on the playfield in a short period of time.

**DON'T:** Use water in large quantities, highly caustic cleaners, abrasive cleaners or cleaning pads on the playfield. Do not allow a wax or polish build up. Waxes yellow with age and spoil play appeal.



## XI. PARTS LIST EIGHT BALL DELUXE

### MISCELLANEOUS

	PART NUMBER
Transformer (Domestic or Export) .....	E-122-142
Bulbs, #44 .....	E-125-22
Fuse, 1 Amp. 3 AG Slow Blow (Playfield Solenoid Protection) .....	E-133-44

### ASSEMBLY COILS

Coin Lockout .....	FO-36-7000
Flipper (3) .....	AQ-25-500/ 34-4500
Knocker .....	AR-26-1200
Outhole Kicker .....	AT-26-1200
Thumper-Bumper (3) .....	AN-26-1200
Sling-Shot (2) .....	AN-26-1200
Drop Target Reset (3) .....	NB-26-1900
Individual Drop Target (2) .....	CV-31-2000
Individual Drop Target (5) .....	CJ-31-2000
Single Drop Target Reset .....	AO-27-1300
Saucer .....	AT-27-1300
<b>PLAYFIELD PARTS</b> .....	See Figure II

### MODULES

Lamp Driver A5 .....	AS-2518-23
Display Driver A1 (1 used) .....	AS-2518-21
Display Driver A1 (4 used) .....	AS-2518-58
Solenoid Driver/Voltage Regulator A3 .....	AS-2518-22
MPU A4 .....	AS-2962-26
Transformer & Rectifier A2 .....	AS-2877-6
Rectifier Board (Part of A2) .....	AS-2518-54
Squawk & Talk .....	AS-3107-2
Auxiliary Lamp Driver A9 .....	AS-2518-52
Solenoid Expander .....	AS-2518-66

### REPAIRS PROCEDURES/AIDS

Module & Component Replacement .....	F.O.560-1
AID (Assistance in Diagnostics) .....	KIT #485-1
Kit, used with F.O.560-1 .....	

### MODULE COMPONENTS

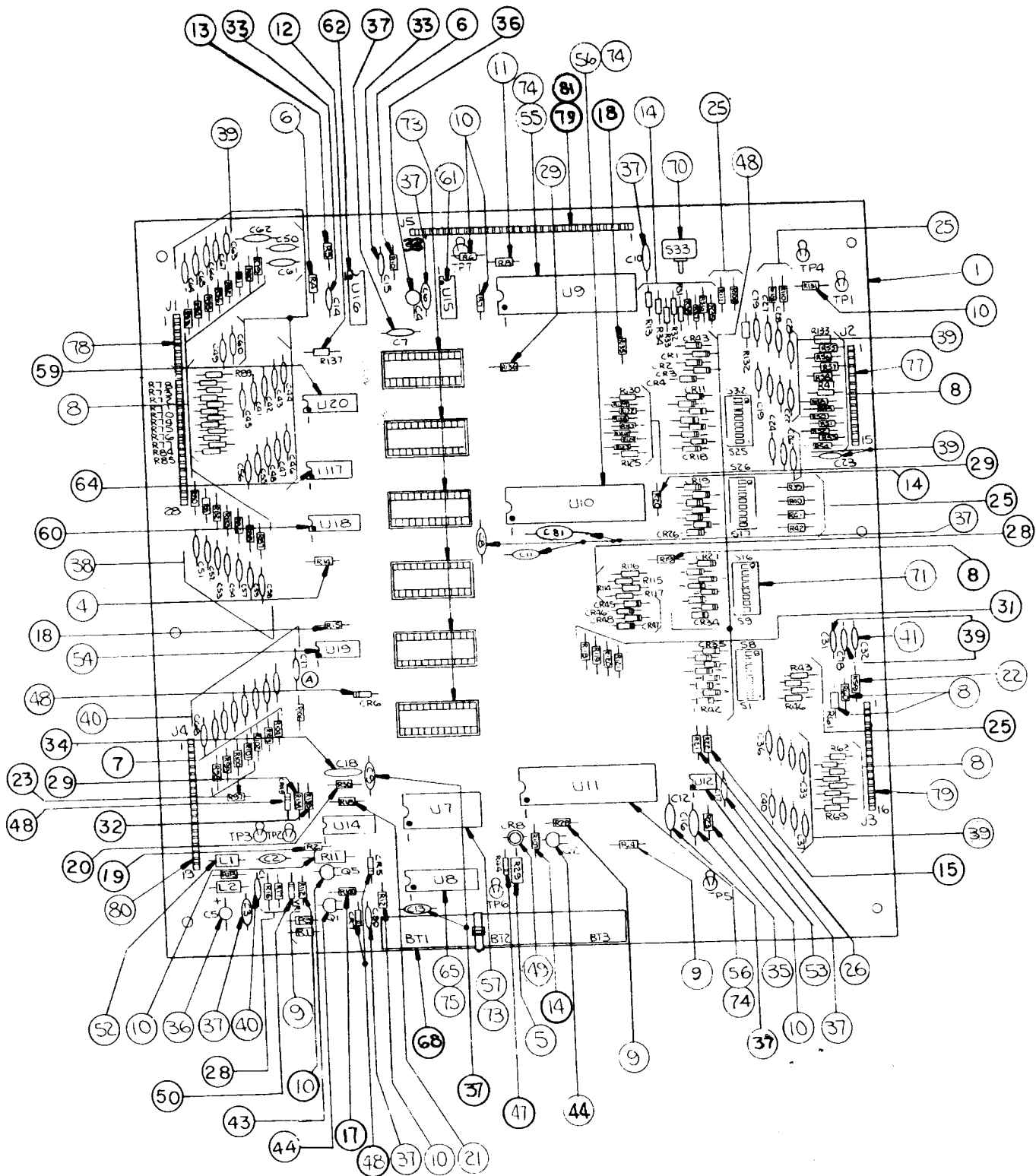
SEE MODULE PARTS LIST

### MODULE COMPONENT STARTER KITS

(Each Kit contains an assortment of the most needed electronic parts for use in Module repair.)

- Kit #558—For Rectifier Board (Part of A2)
- Kit #503—For MPU Board A4 (Less Memory U1-U6)
- Kit #492—For Solenoid Driver/Voltage Regulator A3
- Kit #493—For Display Driver A1
- Kit #494—For Lamp Driver A5

# AS-2518-35 MPU MODULE



# A4: MPU MODULE COMPONENT PARTS LIST

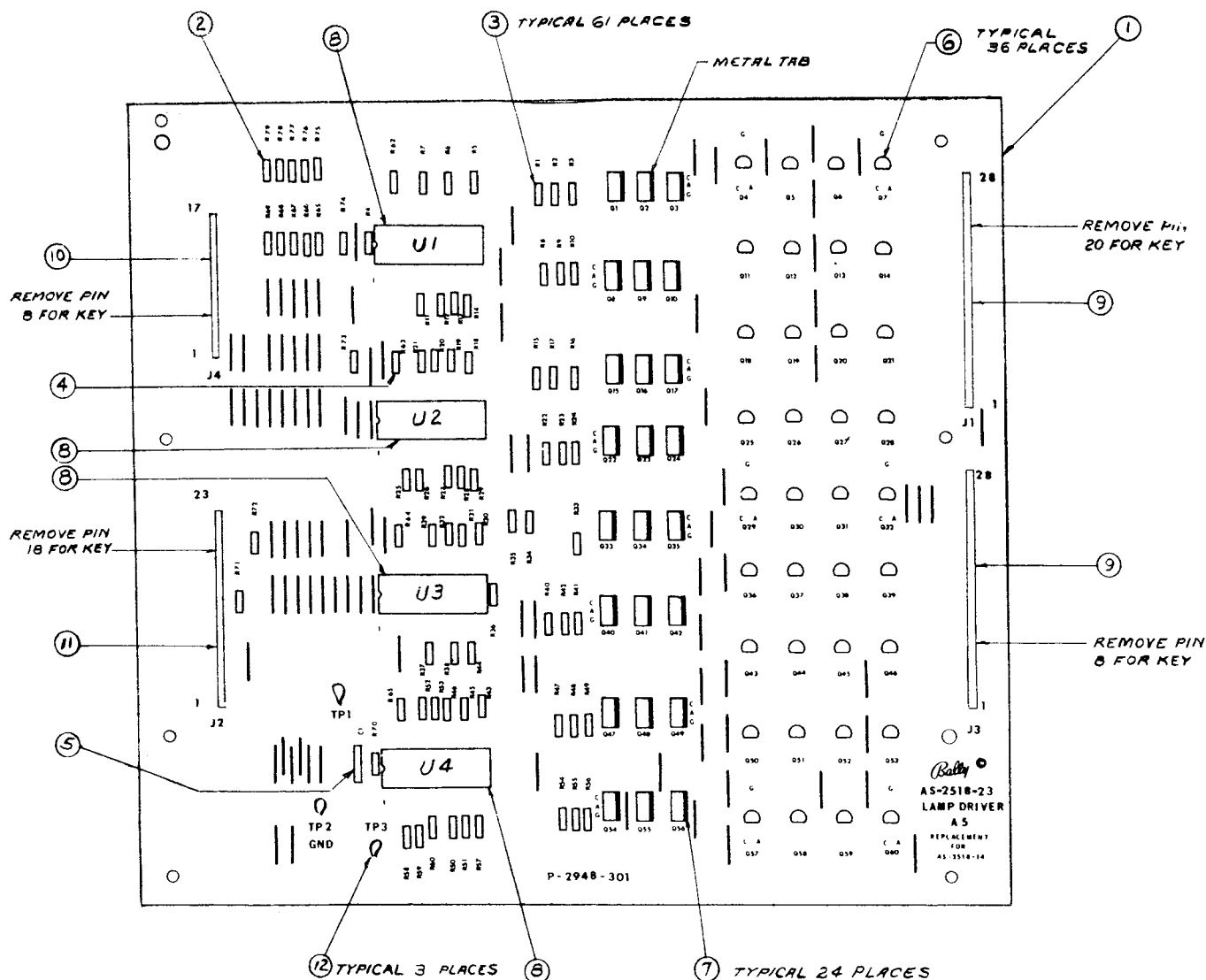
ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	AS-2962-26	MPU Module Complete.
2	A4 (see note 2)	AS-2518-35	MPU Module less Program Memory, U1-6 incl.
3-32	See Schematic		Resistors, See schematic for value
33	C14, C15	E-00586-0067	Capacitor, 470 PFD, 1kv
34	C18	E-00586-0088	Capacitor, .05 MFD, 16V
35	C16	E-00586-0081	Capacitor, .1 MFD, 100V
36	C4, C5	E-00586-0073	Capacitor, 4.5 MFD, 25V
37	C3, C6-C13, C17, C81	E-00586-0085	Capacitor, .01 MFD, 25V
38	C79, C41-C67	E-00586-0083	Capacitor, 470 PFD, 50V
39	C19-C31, C78, C33-C40	E-00586-0082	Capacitor, 390 PFD, 50V
40	C1, C2, C68-C77	E-00586-0084	Capacitor, 820 PFD, 50V
41	C32	E-00586-0077	Capacitor, 3000 PF, 1kv
43	Q5	E-00585-0023	Transistor PNP (MPS-3702)
44	Q1, Q2	E-00585-0031	Transistor (2N3904)
47	CR44	E-00587-0006	Diode (IN4004)
48	CR1-CR7, CR11-CR43, CR45-CR49	E-00587-0014	Diode (IN4148)
49	CR8		
50	VR1	E-00679	LED (Green)
52	L1, L2	E-00598-0008	Diode Zener (8.2V, IN9598)
53	U12	E-00604-0003	Inductor, 22 Micro Hy.
54	U19	E-00620-0004	Timer (555)
55	U9	E-00620-0005	Quad 2 Input (4011)
56	U10, U11	E-00620-0028	MPU I.C. (6800)
57	U7	E-00620-0029	PIA I.C. (6820)
		E-00620-0030	RAM I.C. (6810)
59	U20		
60	U14, U18	E-00620-0032	HEX Buffer I.C. (14502B)
61	U15	E-00620-0033	HEX Inverter (4049B)
62	U16	E-00620-0034	Quad Memory Drive (MC3459L)
		E-00620-0035	Dual Monostable (9602)
64	U17		
65	U8	E-00620-0041	Quad 2 Inputs (74L00N)
68	BT1, BT2, BT3	E-00620-0042	RAM (C MOS, P5101L-3)
70	S33	E-00628-0003	Battery
71	S1-S8, S9-S16, S17-S24, S25-S32	E-00658-0001	Push Button Switch
		E-00677	DIP Switch
73			
74		E-00712	24 Pin Socket
75		E-00712-0001	40 Pin Socket
77	J2	E-00712-0003	22 Pin Socket
78	J1	E-00715	15 Pin Wafer Connector
79	J3, J5	E-00715-0004	28 Pin Wafer Connector
80	J4	E-00715-0017	16 Pin Wafer Connector
81	J5	E-00715-0018	19 Pin Wafer Connector
		E-00715-0024	17 Pin Wafer Connector

## NOTE 1:

When ordering, fill in dash number. For example, AS-2962-0: LOST WORLD, AS-2962-2: SIX MILLION DOLLAR MAN, AS-2962-3: PLAYBOY, AS-2962-4: VOLTAN, AS-2962-5: SUPERSONIC, AS-2962-6: STAR TREK, AS-2962-7: KISS, AS-2962-8: PARAGON, AS-2962-9: GROUND SHAKER, AS-2962-10: HARLEM GLOBE-TERS, AS-2962-12: DOLLY PARTON, AS-2962-13: SILVERBALL MANIA, AS-2962-18: MYSTIC, AS-2962-20: HOTDOGGIN, AS-2962-22: SKATEBALL, AS-2962-23: FRONTIER, AS-2962-21: XENON, AS-2962-24: FLASH GORDON, AS-2962-26: EIGHT BALL DELUXE

**NOTE 2:** Order replacement memory chips U1-U6, specifying game, socket and part number stamped on chip.

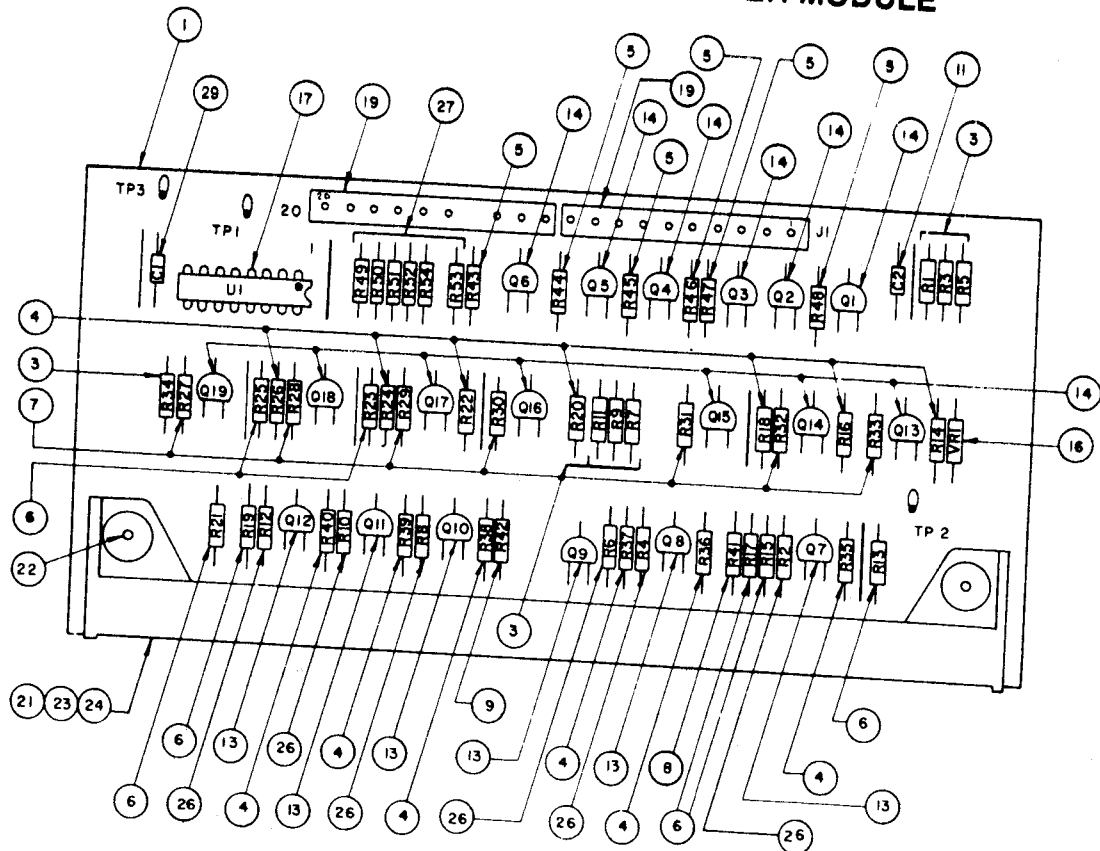
# AS-2518-23 LAMP DRIVER MODULE



## A5: LAMP DRIVER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A5	AS-2518-23	Lamp Driver Module, Complete
2	R71-R79	E-00105-242	Resistor, 20k $\Omega$ , 5%, 1/4 W
3	R1-R60, R70	E-00105-0237	Resistor, 2k $\Omega$ , 5%, 1/4 W
4	R61-R69	E-00105-0256	Resistor, 2.2M $\Omega$ , 1/4 W
5	C1	E-00586-0065	Capacitor, .01 MFD, 500V
6	Q4-Q7, Q11-Q14, Q18-Q21, Q25-Q32, Q36-Q39, Q43-Q46, Q50-Q53, Q57-Q60	E-00585-0014	SCR, 2N5060
7	Q1-Q3, Q8-Q10, Q15-Q17, Q22-Q24, Q33-Q35, Q40-Q42, Q47-Q49, Q54-Q56	E-00585-0029	SCR, MCR106-1
8	U1-U4	E-00620-0037	I.C., Decoder, 14514B
9	J1, J3	E-00715-0004	28 Pin Wafer Connector
10	J4	E-00715-0024	17 Pin Wafer Connector
11	J2	E-00715-0014	23 Pin Wafer Connector
12	TP1, TP2, TP3	P-05399	Test Clip

# AS-2518-21 CREDIT DISPLAY DRIVER MODULE

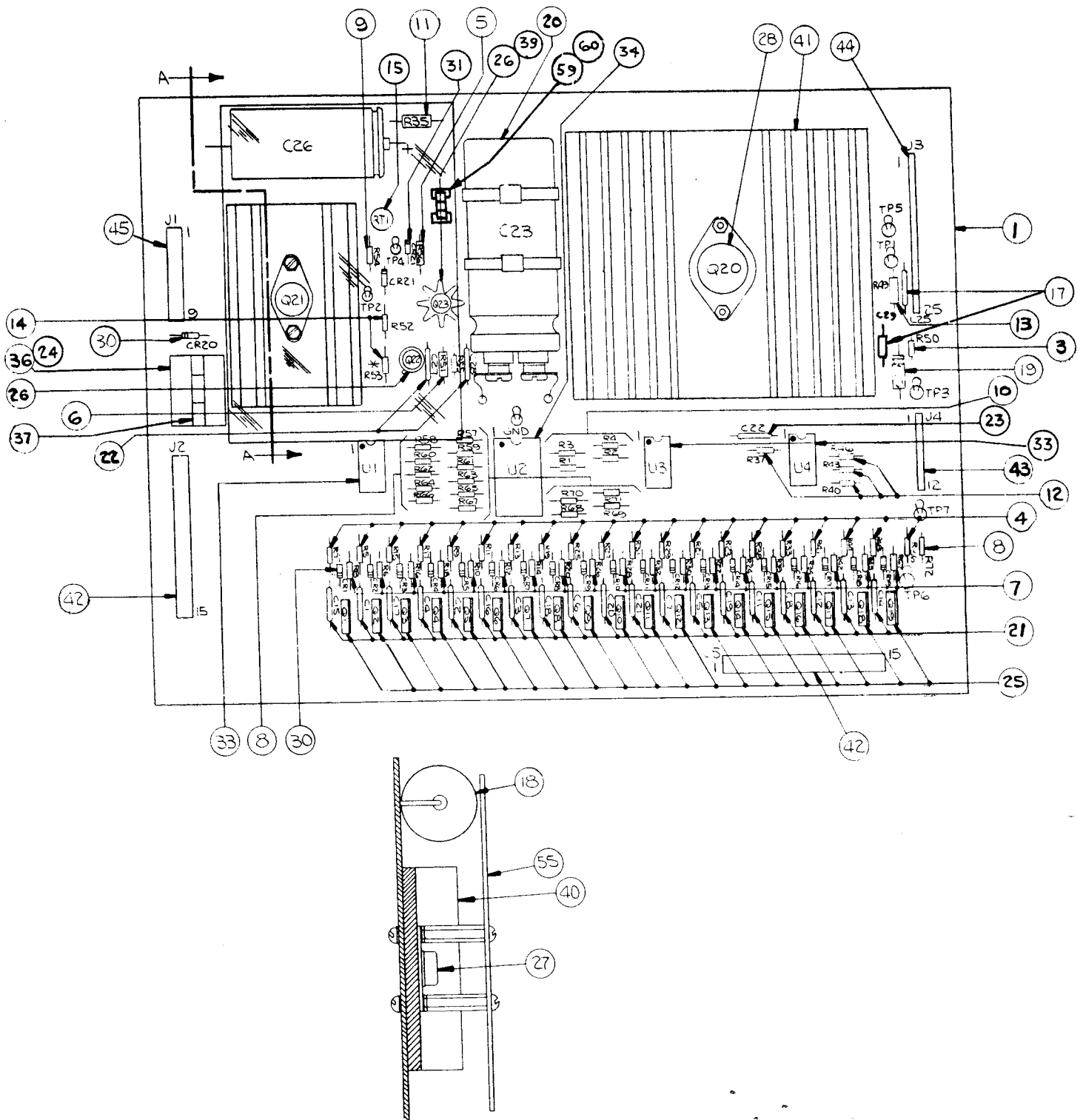


## A1: 6 DIGIT DISPLAY DRIVER MODULE COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1			
3	7	R1, R3, R5, R7, R9, R11, R34	P-2948-296	P.C. Board, M-645-392
4	13	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40	E-105-331	Resistor, 100K $\Omega$
5	6	R43, R44, R45, R46, R47, R48	E-105-227	Resistor, 300K $\Omega$
6	7	R13, R15, R17, R19, R21, R23, R25	E-105-228	Resistor, 9.1K $\Omega$
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-229	Resistor, 1.5K $\Omega$
8	1	R41	E-105-222	Resistor, 1.2K $\Omega$
9	1	R42	E-105-231	Resistor, 39K $\Omega$
10			E-105-271	Resistor, 240K $\Omega$
11	1	C2	E-586-65	Capacitor, .01 MFD, 500V
13	6	Q7, Q8, Q9, Q10, Q11, Q12	E-585-32	Transistor (2N5401)
14	13	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19	E-585-33	Transistor (MPS-A42)
16	1	VR1		
17	1	U1	E-598-7	Zener Diode, 110V
18			E-620-38	I.C. Decoder
19	2	J1		
21	1	DS1	E-715-34	10 Pin.Wafer Pin Connector
22	2		E-680	Digital Display Panel
23	1		M-1836	Hi-Lo Screw, W/H
24	1		P-2399	Display Mounting (Top)
26	6	R2, R4, R6, R8, R10, R12	P-2399-1	Display Mounting (Bottom)
27	6	R49, R50, R51, R52, R53, R54	E-105-287	Resistor, 2.2K $\Omega$
28	As Req'd		E-105-242	Resistor, 20K $\Omega$
29	1	C1		Wire Jumper
			E-586-85	Capacitor, .01 MFD, 25V

NOTE: INTERCHANGEABLE WITH AS-2518-15

# AS-2518-22 SOLENOID DRIVER/VOLTAGE REGULATOR MODULE



NOTE: INTERCHANGEABLE WITH AS-2518-16

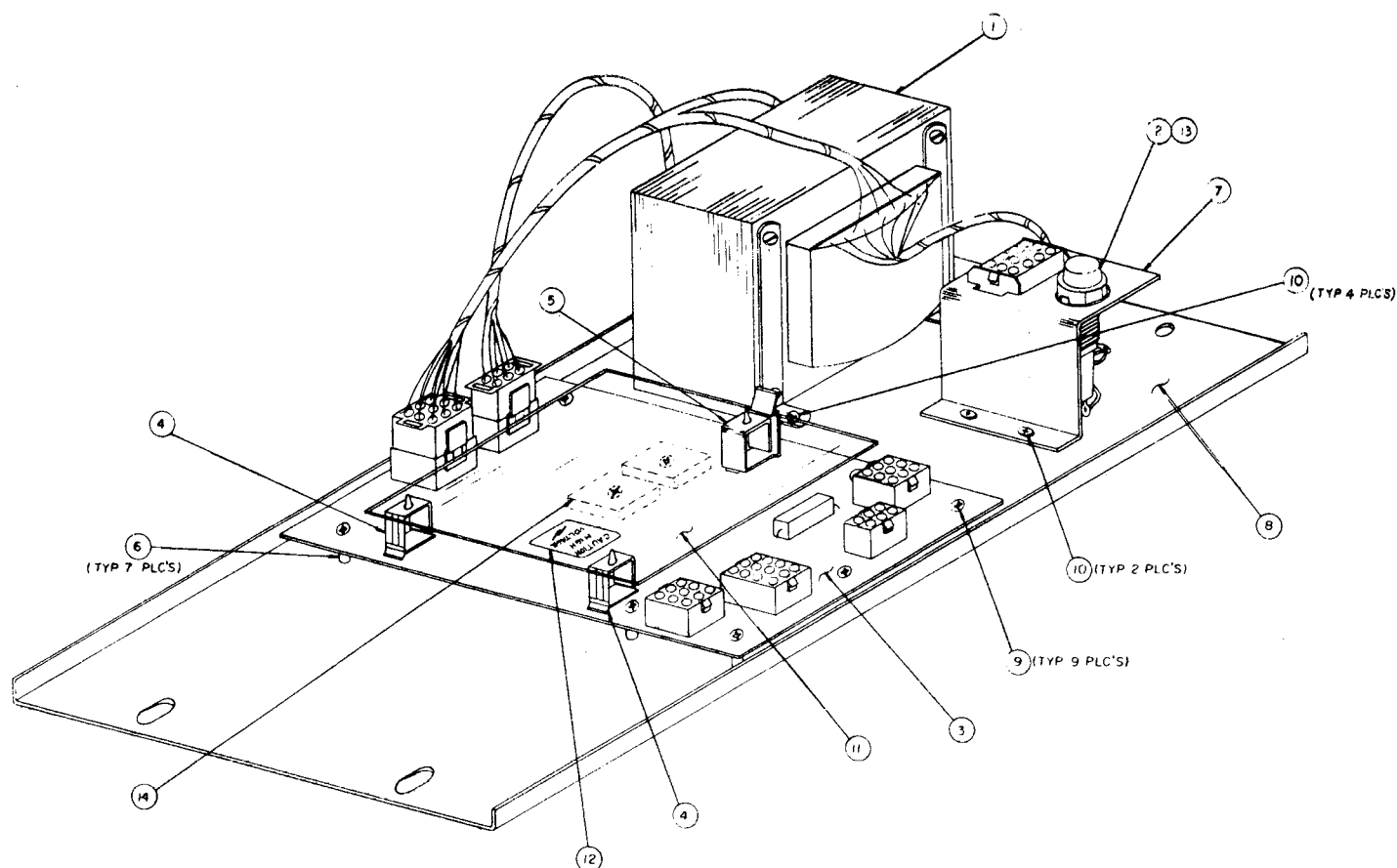
# A3: SOLENOID DRIVER/VOLTAGE REGULATOR MODULE

## COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A3	AS-2518-22	Solenoid Driver/Voltage Regulator Module, Complete Resistor, See Schematic for value.
3-14	Resistors		
15	RT1	E-00599-0014	Pot. (Linear) 25K
17	C25, 29	E-00586-0014	Capacitor, .1 MFD, 20V
18	C26	E-00586-0059	Capacitor, 160 MFD, 350V
19	C24	E-00586-0063	Capacitor, 2 MFD @ 25V
20	C23	E-00586-0062	Capacitor, 11700 MFD, 20V
21	C1-C8, C11-C21	E-00586-0064	Capacitor, .002 MFD, 1kv
22	C27, C28	E-00586-0065	Capacitor, .01 MFD, 500V
24	K1	E-00146-0795	Relay, Printed Circuit
25	Q1-Q19	E-00585-0034	Transistor, SE9302
26	Q22, Q23	E-00585-0041	Transistor, 2N3440
27	Q21	E-00585-0042	Transistor, 2N3584
28	Q20	E-00710	+5V Regulator, LAS1405 or 78H05KC or LM323K
30	CR1-CR21	E-00587-0015	Diode (IN4004)
31	VR1	E-00598-0010	Diode, Zener 140V, IN5275A
33	U1, U3, U4	E-00681	I.C. Transistor Array, CA3081
34	U2	E-00620-0039	I.C. Binary to 1/16 Decoder, 74L154
36		E-00592-0002*	Relay Socket
37		M-1839*	Relay Holder
39		E-00682	Heat Sink, TO5
40		E-00682-0001	Heat Sink, TO66
41		E-00682-0002	Heat Sink, TO3 Case
42		E-00715-0039	15 Pin Wafer Connector
43		E-00715-0016	12 Pin Wafer Connector
44		E-00715-0020	25 Pin Wafer Connector
45		E-00715-0033	9 Pin Wafer Connector
55		M-1838	Shield-Plexiglass
59		E-00148-0021	Fuse Clips
60	F1	E-00133-0029	Fuse 8 AG-3/16 Amp.
23	C22	E-00586-0085	Capacitor, .01 MFD, 25V

\*USED WITH ITEM 24, E-00146-0791, PLUG IN RELAY ONLY

## A2: POWER TRANSFORMER MODULE

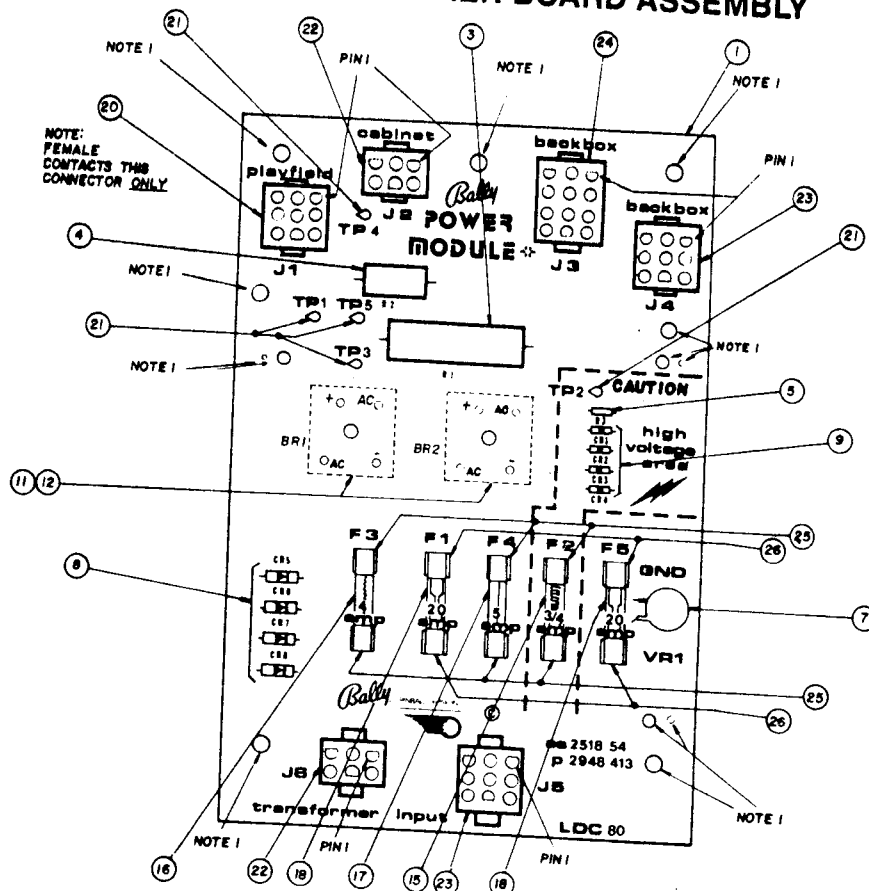


### COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-6	Power Transformer Module, Complete
1		AS-3071-2	Transformer
2		E-148-25	Fuse Holder
3	A2	AS-2518-54	Power Module Assy.
4		M-1829-4	Hinged Support
5		M-1829-3	Edge Holder
6		M-1829-5	Spacer
7		P-6442-244b	Fuse & Connect Brkt.
8		P-6442-246	Chassis
9		RLPP-832-1812	Screw
10		RLPP-1032-1806	Screw
11		P-2692-2	Shield
12		M-469-936a	High Voltage Sticker
13		E-133-24	3A S.B. Fuse
14		M-1834	H. S. Compound



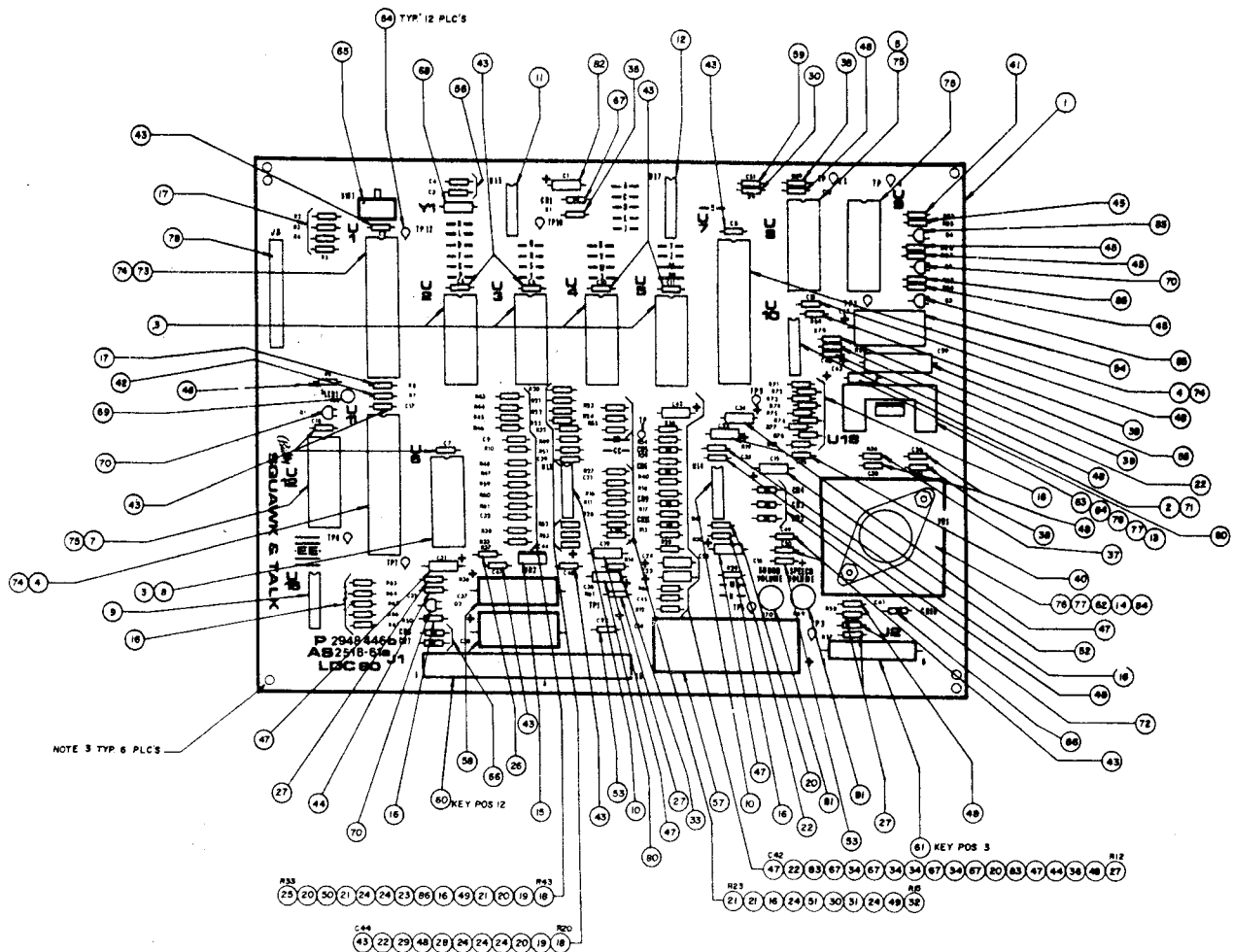
# AS-2518-54 RECTIFIER BOARD ASSEMBLY



## (Part of) A2: POWER TRANSFORMER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-6	Power Transformer Module, Complete
1	P/O A2	AS-2518-54	Rectifier Board Assembly, Complete
3	R1	E-00104-0092	Resistor, 10%, 600 Ohm, 10W
4	R2	E-00104-0091	Resistor, 25 Ohm, 5W
5	R3	E-00105-0226	Resistor, 5%, 100K Ohm, 1/4W
7	VR1	E-00623	Varistor
8	CR5, CR6, CR7, CR8	E-00587-0022	3A Diode
9	CR1, CR2, CR3, CR4	E-00587-0015	Diode (IN4004)
10			
11	Used with BR1-2	P-1973-480	Spacer
12	BR1, BR2	E-00602-0006	Bridge Rectifier
15	F2	E-00133-0028	Fuse, 3/4A, 250V, 3AG
16	F3	E-00133-0004	Fuse, 4A, 32V, 3AG
17	F4	E-00133-0005	Fuse 5A, 32V, 3AG
18	F1, F5	E-00133-0027	Fuse, 20A, 32V, 3AG
19			
20	J1	E-806-9	9 CKT Socket Header
21	TP1, 2, 3, 4, 5	P-05399	Test Clip
22	J2, J6	E-805-6	6 CKT Pin Header
23	J4, J5	E-805-9	9 CKT Pin Header
24	J3	E-805-12	12 CKT Pin Header
25	F2, 3, 4	E-00148-0021	Fuse Clips
26	F1, 5	E-00148-0022	Fuse Clips (Low Resistance)

# SQUAWK & TALK MODULE AS 2518-61A



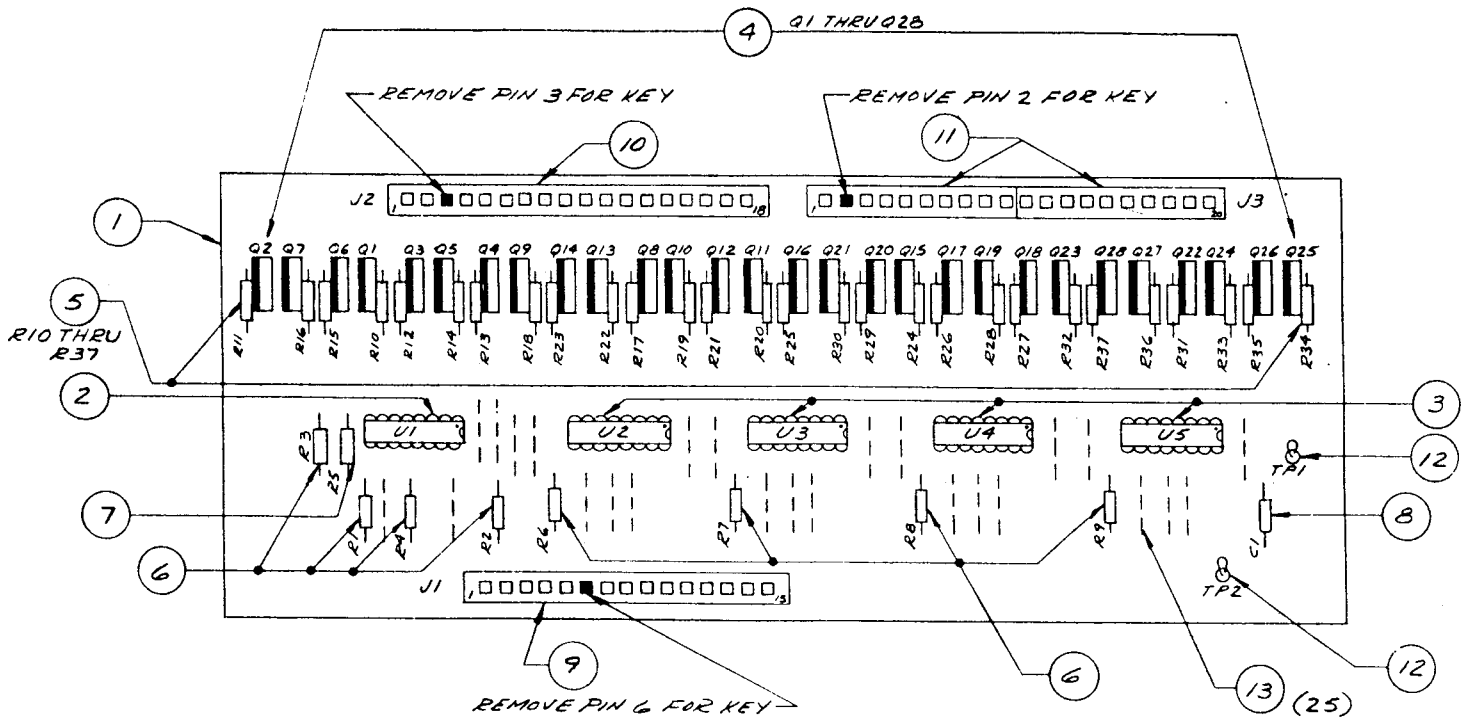
ITEM	QTY.	REFERENCE DESIGNATION	DESCRIPTION	BALLY PART #
1	1	PWB	M-645-577b	P-2948-446b
2	1	U10	AD 558 DAC	E-620-171
3	5	Used with U2 thru U6	24 Pin I.C. Socket	E-712
4	2	U7, U11	6821 P.I.A.	E-620-29
5	1	U8	Tms 5200 Speech	E-620-167
7	1	U12	AY3-8912 Sound	E-620-166
8	1	U6	6810 RAM (SEE NOTE 1)	E-620-30
9	1	U16	4049 Hex Inverter	E-620-33
10	2	U13, U14	LM 3900	E-620-126
11	1	U15	74LS14 Schmidt Inverter	E-620-169
12	1	U17	74LS155	E-620-168
13	1	U18	TDA 2002 Power Amp	E-620-127
14	1	VR1	LM323, 5V Regulator	E-710
15	1	VR2	7905, -5V Regulator	E-620-165
16	19	R10, 19, 29, 42, 50, 63-67, 71-78, 55	Resistor, 1/4W, 10K	E-105-185
17	5	R2-5,8	Resistor, 1/4W, 5%, 3.3K	E-105-238
18	2	R20, 43	Resistor, 1/4W, 5%, 820K	E-105-343
19	2	R21, 44	Resistor, 1/4W, 5%, 390K	E-105-310
20	5	R13, 22, 38, 41, 45	Resistor, 1/4W, 200K	E-105-225
21	4	R23, 24, 46, 61	Resistor, 1/4W, 5% 100K	E-105-226
22	4	R30, 53, 56, 80	Resistor, 1/4W, 5% 2K	E-105-237
23	1	R47	Resistor, 1/4W, 5%, 2.7K	E-105-151
24	7	R25, 26, 27, 32, 49, 59, 60	Resistor, 1/4W, 5% 1m	E-105-285
25	1	R33	Resistor, 1/4W, 5%, 91K	E-105-313

# SQUAWK & TALK MODULE AS 2518-61A

## COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	DESCRIPTION	BALLY PART #
26	1	R37	Resistor, 1/4W, 5%, 30K	E-105-245
27	5	R12, 36, 57, 58, 81	Resistor, 1/4W, 5%, 1K	E-105-230
28	1	R51	Resistor, 1/4W, 5%, 750K	E-105-344
29	1	R52	Resistor, 1/4W, 5%, 9.1K	E-105-228
30	2	R9, 16	Resistor, 1/4W, 5%, 130K	E-105-203
31	1	R11	Resistor, 1/4W, 5%, 150K	E-105-248
32	1	R15	Resistor, 1/4W, 5%, 220K	E-105-161
33	1	R14	Resistor, 1/4W, 5%, 1.8K	E-105-346
34	4	R17, 18, 39, 40	Resistor, 1/4W, 5%, 910K	E-105-347
35	1	R1	Resistor, 1/4W, 5%, 27K	E-105-243
36	1	R68	Resistor, 1/4W, 5%, 510 $\Omega$	E-105-311
37	1	R34	Resistor, 1/4W, 5%, 2.2 $\Omega$	E-105-211
38	3	R31, 88, 89	Resistor, 1/4W, 5%, 220 $\Omega$	E-105-303
39	1	R79	Resistor, 1/4W, 5%, 7.5K	E-105-345
40	1	R35	Resistor, 1/4W, 5%, 1 $\Omega$	E-105-196
41	1	R83	Resistor, 1/4W, 5%, 11K	E-105-360
42	1	R7	Resistor, 1/4W, 5%, 8.2K	E-105-223
43	14	C2, 5-8, 10, 11, 17, 18, 44, 47-50	Capacitor, Ceramic, .01 $\mu$ F, 25V	E-586-85
44	2	C23, 35	Capacitor, Ceramic, .47 $\mu$ F, 16V	E-586-130
45	4	R84-87	Resistor, 1/4W, 5%, 2.2K	E-105-287
46	1	R6	Resistor, 1/4W, 470 $\Omega$	E-105-342
47	7	C19, 24, 25, 28, 31, 34, 42	Capacitor, Electrolytic, 1 $\mu$ F, 25V	E-586-90
48	10	C12, 13, 26, 30, 33, 39, 40, 41, 45, 46	Capacitor, Ceramic, .1 $\mu$ F, 25V	E-586-89
49	2	C9, 20	Capacitor, Ceramic, 470pF, 50V	E-586-83
50	1	C32	Capacitor, Ceramic, 68pF	E-586-120
51	1	C21	Capacitor, Ceramic, 100pF	E-586-68
52	1	C15	Capacitor, Electrolytic, 10 $\mu$ F, 16V	E-586-135
53	2	C16, 22	Capacitor, Tantalum, 4.7 $\mu$ F, 25V	E-586-73
54	1	C27	Capacitor, Electrolytic, 1000 $\mu$ F, 16V	E-586-136
55	1	C29	Capacitor, Electrolytic, 470 $\mu$ F, 6V	E-586-124
56	2	C3, 4	Capacitor, Ceramic, 27pF	E-586-121
57	1	C14	Capacitor, Electrolytic, 4700 $\mu$ F, 25V	E-586-123
58	2	C37, 38	Capacitor, Electrolytic, 330 $\mu$ F, 50V	E-586-147
59	1	C51	Capacitor, Monolithic, 10pF	E-586-150
60	1	J1	18 Pin Wafer Connector (156)	E-736-18
61	1	J2	6 Pin Wafer Connector (156)	E-736-6
62	1	Used with VR1	Heatsink, 6053B	E-682-11
63	1	Used with U18	Heatsink, 6030B	E-682-8
64	12		Test Points	P-5399
65	1	SW. 1	P.C.B. Switch	E-658-1
66	3	CR7, 8, 10	Diode (IN4004)	E-587-15
67	5	CR1, 5, 6, 9, 11	Diode (IN4148)	E-587-14
68	1	Y1	Crystal, 3.579	E-744-5
69	1	LED1	LED	E-679
70	3	Q1-2, 5	Transistor, 2N3904	E-585-31
71	1	Used with U10	Socket I.C. 16 Pin	E-712-16
72	3	CR2-4	Diode, VR332	E-587-22
73	1	U1	6808 or 6802 (SEE NOTE 1)	E-620-125 or 128
74	3	Used with U1, 7, 11	Microprocessor	E-712-1
75	3	Used with U8, 9, 12	Socket, I.C. 40 Pin	E-712-28
76	3	Used with U18, VR1	Socket, I.C. 28 Pin	LSPR-00632-1106
77	3	Used with U18, VR1	Screw	N-00632-2112
78	2	J3	Nut	E-766-20
80	2	C36, 43	Header, 20 Pin	
81	2	R69, 70	Capacitor, 2 $\mu$ F, 16V	E-586-63
82	1	C1	Pot. 1K	E-599-16
83	2	R28, 54	Capacitor, Electrolytic, 47 $\mu$ F	E-586-148
84	AR	Used with U18, VR1	Resistor, 82K	E-105-341
85	2	Q3, 4	Thermal Compound	M-1834
86	2	R82, 48	Transistor, 2N4403	E-585-23
			Resistor, 1/4W, 5%, 2.4K	E-105-312
			JUMPERS—SEE NOTES	

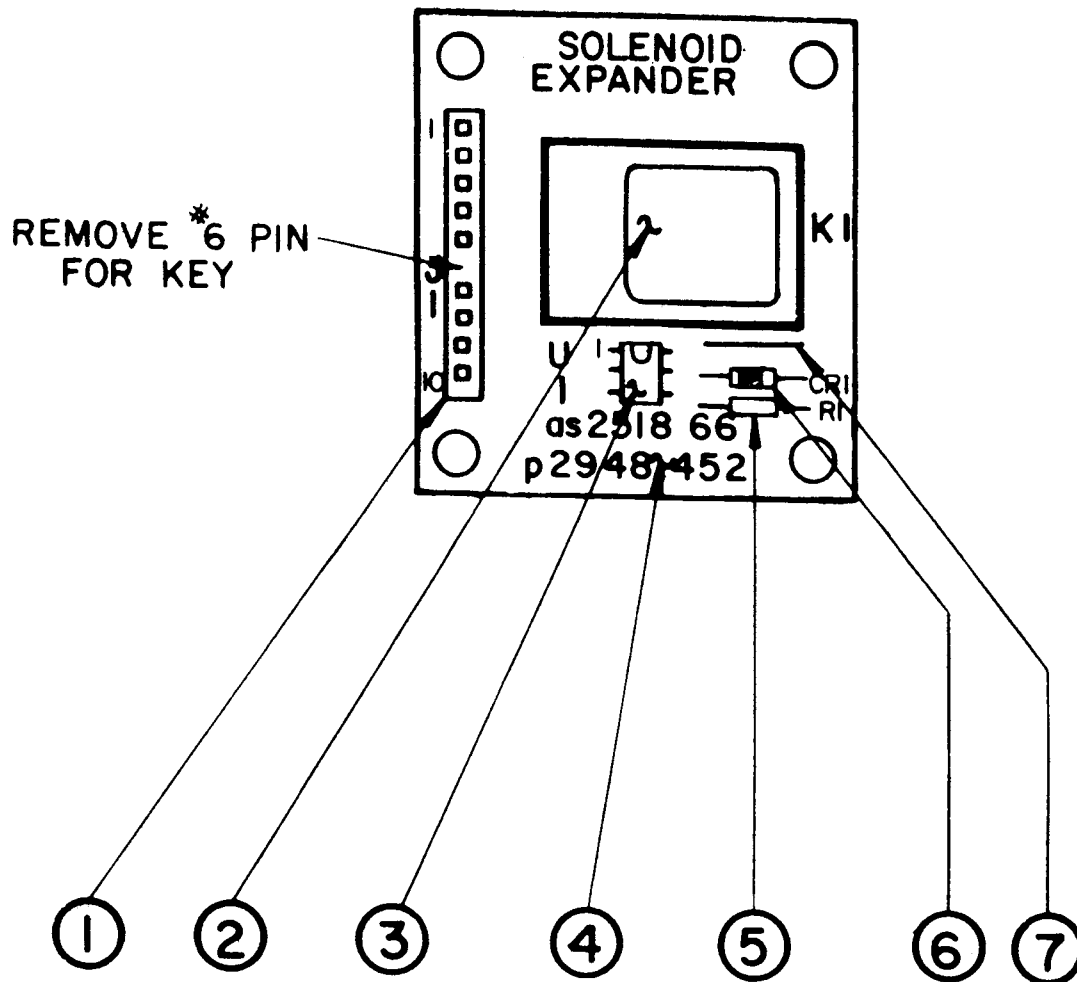
## AS-2518-52 AUXILIARY LAMP DRIVER



### A9: AUXILIARY LAMP DRIVER COMPONENT PARTS LIST

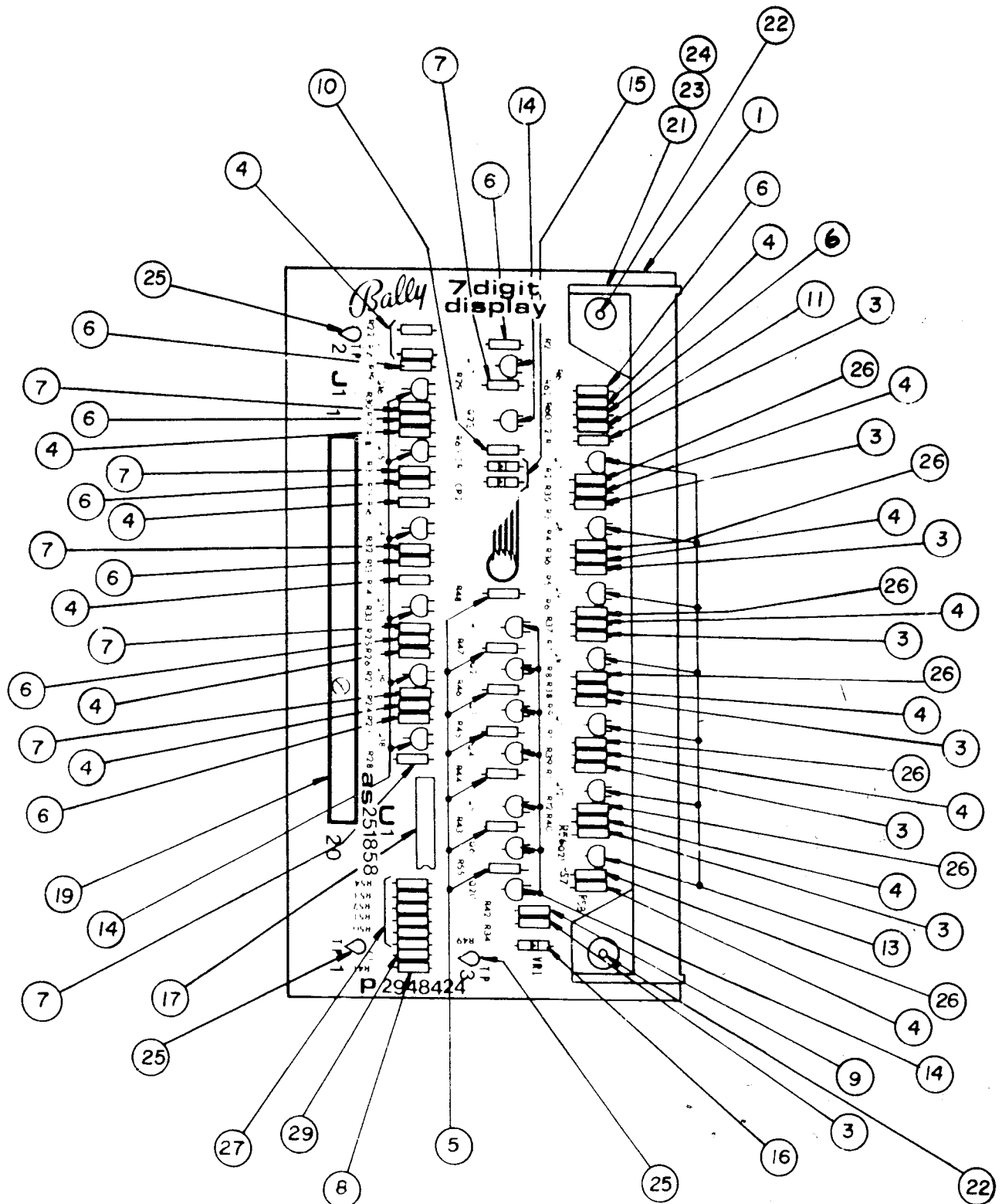
ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART NO.	DESCRIPTION
1	1		P-2948-504	P.C.B. (M-645-512)
2	1	U1	E-620-134	Quad Flip Flop
3	4	U2 Thru U5	E-620-108	BCD to Decimal Decoder
4	28	Q1 Thru Q28	E-585-29	S.C.R.
5	28	R10 Thru R37	E-105-237	Resistor, 2K $\Omega$ , 1/4 W, 5%
6	8	R1-4, R6-9	E-105-242	Resistor, 20K $\Omega$ , 1/4 W, 5%
7	1	R5	E-105-173	Resistor, 2.2M, 1/4 W, 5%
8	1	C1	E-586-85	Capacitor, .01 $\mu$ f, 25V, $\pm 20$ %
9	1	J1	E-736-15	Connector, KK156 15 Pin
10	1	J2	E-736-18	Connector, KK156 18 Pin
11	2	J3	E-736-10	Connector, KK156 10 Pin
12	2	TP1, TP2	P-5399	Test Point
13	25		M-1777-126	Jumper

# **A15: SOLENOID EXPANDER ASSEMBLY** **AS-2518-66**



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	J1	E-736-10	10 Pin 'Molex' KK156
2	K1	E-146-795	48 V. Relay
3	U1	E-620-172	MOC 3011
4	P-2948-452	M-645-585	P.C. Board
5	R1	E-105-219	330 Ohm Resistor
6	CR1	E-587-15	IN4004 Diode
7		Jumper	AWG. 22 1½"
Ref.		W-1251b	Schematic

# AS-2518-58 DISPLAY DRIVER MODULE



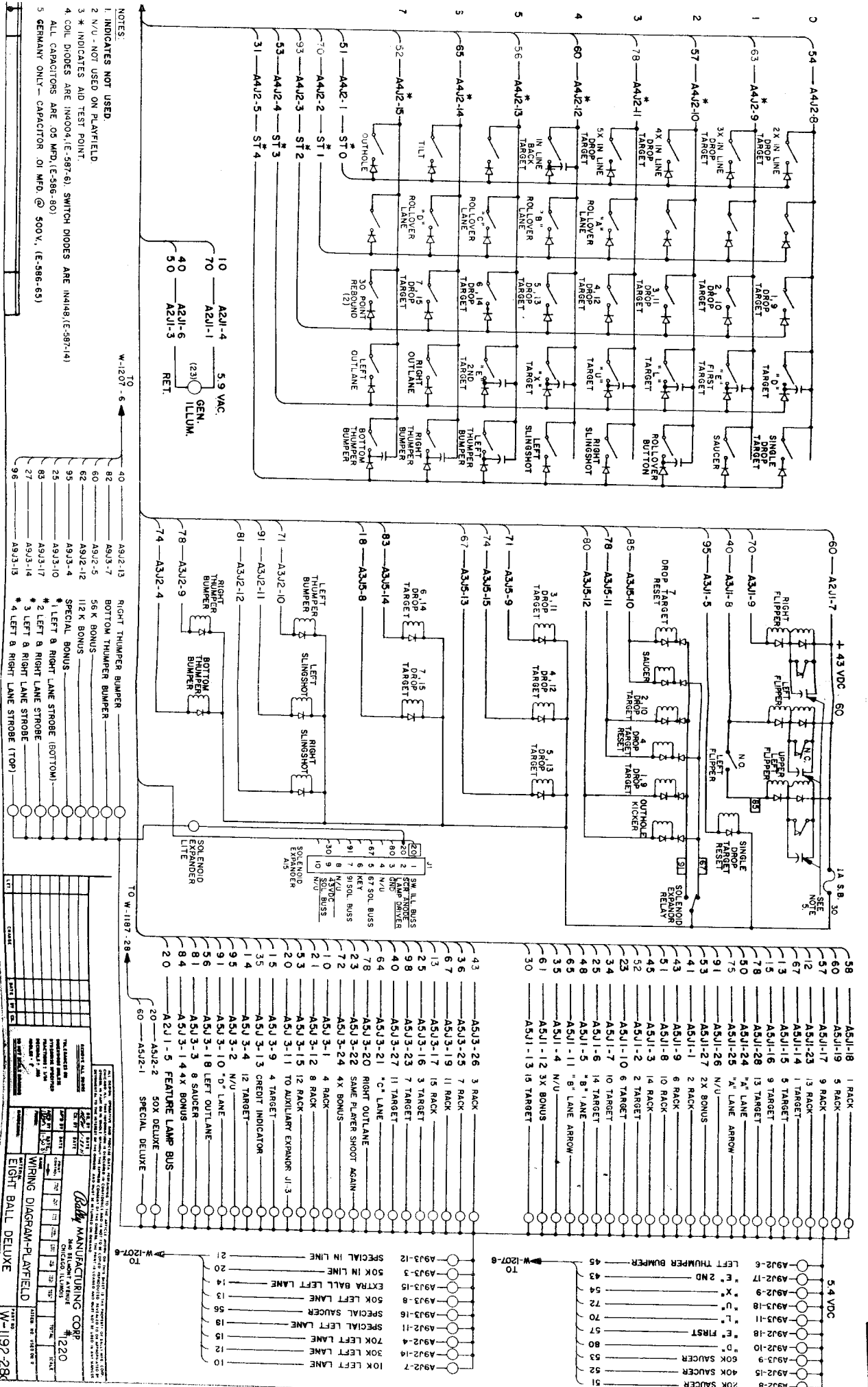
# A1: 7 DIGIT DISPLAY DRIVER MODULE

## COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1			
3	8	R1, R3, R5, R7, R9, R11, R34, R56	P-2948-424 E-105-331	P.C. Board, M-645 546 Resistor, 100K $\Omega$
4	15	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40, R58, R62	E-105-227	Resistor, 300K $\Omega$
5	7	R43, R44, R45, R46, R47, R48, R55	E-105-228	Resistor, 9.1K $\Omega$
6	9	R13, R15, R17, R19, R21, R23, R25, R61, R60	E-105-229	Resistor, 1.5K $\Omega$
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-222	Resistor, 1.2K $\Omega$
8	1	R41	E-105-231	Resistor, 39K $\Omega$
9	1	R42	E-105-271	Resistor, 240K $\Omega$
10	1	R63	E-105-248	Resistor, 150K $\Omega$
11	1	C2	E-586-65	Capacitor, .01 MFD, 500V
13	7	Q7, Q8, Q9, Q10, Q11, Q12, Q21	E-585-32	Transistor (2N5401)
14	15	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q22	E-585-33	Transistor (MPS-A42)
15	2	CR1-2	E-587-14	Diode (IN4148)
16	1	VR1	E-598-7	Zener Diode, 110V (IN3045A)
17	1	U1	E-620-38	I.C. Decoder (MC14543)
18				
19	2	J1	E-736-10	10 Pin Wafer Pin Connector (KK-156)
21	1	DS1	E-680-7	7 Digital Display Panel
22	2		M-1836	Hi-Lo Screw, W/H
23	1		P-2399	Display Mounting (Top)
24	1		P-2399-1	Display Mounting (Bottom)
25	3	TP1-3	P-5399	Test Clip
26	7	R2, R4, R6, R8, R10, R12, R57	E-105-287	Resistor, 2.2K $\Omega$
27	6	R49, R50, R51, R52, R53, R54	E-105-242	Resistor, 20K $\Omega$
28				
29	1	C1	E-586-85	Capacitor, .01 MFD, 25V







W.

NOTES:

1. INDICATES NOT USED.
- 2 N/U - NOT USED ON PLAYFIELD.
- 3 \* INDICATES AID TEST POINT.
4. COLL DIODES ARE 1N4004, (E-587-6). SWITCH DIODES ARE 1N4148, (E-587-14)
5. ALL CAPACITORS ARE .05 MFD, (E-586-80)
6. GERMANY ONLY - CAPACITOR .01 MFD, @ 500V., (E-586-65)

[illegible]

TABLE A AIJ2

FROM	PIN	WIRE
A232-11	2	20
A232-14	2	12
A234-4	3	40
A234-6	4	40
A234-8	4	40
A322-23	5	97
A322-15	6	23
A322-22	7	62
A322-8	8	70
A322-1	9	60
A322-10	10	30
A322-11	11	95
A322-12	12	47
A322-13	13	35
A322-14	14	91
A322-6	15	85
A322-20	16	98
A322-18	17	34
A323-1	18	50
A323-2	19	70
A323-13	20	49
A323-12	21	41
A323-22	22	22
A323-1	23	33
A323-2	24	70

INSERT TO BACK CAB.  
P111G

**AI INSERT**

(PLAYER 1)	(PLAYER 2)	(PLAYER 3)	(PLAYER 4)	CREDIT
1A1	2A1	3A1	4A1	5A1
10- A3J3-8	1	1	1	1
N/U	2	2	2	2
N/U	3	3	3	3
50- A4J1-1	4	4	4	4
50- A4J1-2	5	5	5	5
50- A4J1-3	6	6	6	6
50- A4J1-4	7	7	7	7
50- A4J1-5	8	8	8	8
50- A4J1-6	9	9	9	9
50- A4J1-7	10	10	10	10
70- A4J1-10	11	11	11	11
N/U	12	12	12	12
60- A4J3-20	13	13	13	13
KEY	14	14	14	14
85- A4J1-20	15	15	15	15
54- A4J1-26	16	16	16	16
38- A4J1-27	17	17	17	17
23- A4J1-26	18	18	18	18
51- A4J1-25	19	19	19	19
43- A3J3-17	20	20	20	20

→ SEE  
TABLE A

**LAMP DRIVER A5**

TO	J1	TO	J3	TO	J5	TO	J7	TO	J9	TO	J11	TO	J13	TO	J15	TO	J17	TO	J19	TO	J21	TO	J23	TO	J25	TO	J27	TO	J29	TO	J31	TO	J33	TO	J35	TO	J37	TO	J39	TO	J41	TO	J43	TO	J45	TO	J47	TO	J49	TO	J51	TO	J53	TO	J55	TO	J57	TO	J59	TO	J61	TO	J63	TO	J65	TO	J67	TO	J69	TO	J71	TO	J73	TO	J75	TO	J77	TO	J79	TO	J81	TO	J83	TO	J85	TO	J87	TO	J89	TO	J91	TO	J93	TO	J95	TO	J97	TO	J99	TO	J101	TO	J103	TO	J105	TO	J107	TO	J109	TO	J111	TO	J113	TO	J115	TO	J117	TO	J119	TO	J121	TO	J123	TO	J125	TO	J127	TO	J129	TO	J131	TO	J133	TO	J135	TO	J137	TO	J139	TO	J141	TO	J143	TO	J145	TO	J147	TO	J149	TO	J151	TO	J153	TO	J155	TO	J157	TO	J159	TO	J161	TO	J163	TO	J165	TO	J167	TO	J169	TO	J171	TO	J173	TO	J175	TO	J177	TO	J179	TO	J181	TO	J183	TO	J185	TO	J187	TO	J189	TO	J191	TO	J193	TO	J195	TO	J197	TO	J199	TO	J201	TO	J203	TO	J205	TO	J207	TO	J209	TO	J211	TO	J213	TO	J215	TO	J217	TO	J219	TO	J221	TO	J223	TO	J225	TO	J227	TO	J229	TO	J231	TO	J233	TO	J235	TO	J237	TO	J239	TO	J241	TO	J243	TO	J245	TO	J247	TO	J249	TO	J251	TO	J253	TO	J255	TO	J257	TO	J259	TO	J261	TO	J263	TO	J265	TO	J267	TO	J269	TO	J271	TO	J273	TO	J275	TO	J277	TO	J279	TO	J281	TO	J283	TO	J285	TO	J287	TO	J289	TO	J291	TO	J293	TO	J295	TO	J297	TO	J299	TO	J301	TO	J303	TO	J305	TO	J307	TO	J309	TO	J311	TO	J313	TO	J315	TO	J317	TO	J319	TO	J321	TO	J323	TO	J325	TO	J327	TO	J329	TO	J331	TO	J333	TO	J335	TO	J337	TO	J339	TO	J341	TO	J343	TO	J345	TO	J347	TO	J349	TO	J351	TO	J353	TO	J355	TO	J357	TO	J359	TO	J361	TO	J363	TO	J365	TO	J367	TO	J369	TO	J371	TO	J373	TO	J375	TO	J377	TO	J379	TO	J381	TO	J383	TO	J385	TO	J387	TO	J389	TO	J391	TO	J393	TO	J395	TO	J397	TO	J399	TO	J401	TO	J403	TO	J405	TO	J407	TO	J409	TO	J411	TO	J413	TO	J415	TO	J417	TO	J419	TO	J421	TO	J423	TO	J425	TO	J427	TO	J429	TO	J431	TO	J433	TO	J435	TO	J437	TO	J439	TO	J441	TO	J443	TO	J445	TO	J447	TO	J449	TO	J451	TO	J453	TO	J455	TO	J457	TO	J459	TO	J461	TO	J463	TO	J465	TO	J467	TO	J469	TO	J471	TO	J473	TO	J475	TO	J477	TO	J479	TO	J481	TO	J483	TO	J485	TO	J487	TO	J489	TO	J491	TO	J493	TO	J495	TO	J497	TO	J499	TO	J501	TO	J503	TO	J505	TO	J507	TO	J509	TO	J511	TO	J513	TO	J515	TO	J517	TO	J519	TO	J521	TO	J523	TO	J525	TO	J527	TO	J529	TO	J531	TO	J533	TO	J535	TO	J537	TO	J539	TO	J541	TO	J543	TO	J545	TO	J547	TO	J549	TO	J551	TO	J553	TO	J555	TO	J557	TO	J559	TO	J561	TO	J563	TO	J565	TO	J567	TO	J569	TO	J571	TO	J573	TO	J575	TO	J577	TO	J579	TO	J581	TO	J583	TO	J585	TO	J587	TO	J589	TO	J591	TO	J593	TO	J595	TO	J597	TO	J599	TO	J601	TO	J603	TO	J605	TO	J607	TO	J609	TO	J611	TO	J613	TO	J615	TO	J617	TO	J619	TO	J621	TO	J623	TO	J625	TO	J627	TO	J629	TO	J631	TO	J633	TO	J635	TO	J637	TO	J639	TO	J641	TO	J643	TO	J645	TO	J647	TO	J649	TO	J651	TO	J653	TO	J655	TO	J657	TO	J659	TO	J661	TO	J663	TO	J665	TO	J667	TO	J669	TO	J671	TO	J673	TO	J675	TO	J677	TO	J679	TO	J681	TO	J683	TO	J685	TO	J687	TO	J689	TO	J691	TO	J693	TO	J695	TO	J697	TO	J699	TO	J701	TO	J703	TO	J705	TO	J707	TO	J709	TO	J711	TO	J713	TO	J715	TO	J717	TO	J719	TO	J721	TO	J723	TO	J725	TO	J727	TO	J729	TO	J731	TO	J733	TO	J735	TO	J737	TO	J739	TO	J741	TO	J743	TO	J745	TO	J747	TO	J749	TO	J751	TO	J753	TO	J755	TO	J757	TO	J759	TO	J761	TO	J763	TO	J765	TO	J767	TO	J769	TO	J771	TO	J773	TO	J775	TO	J777	TO	J779	TO	J781	TO	J783	TO	J785	TO	J787	TO	J789	TO	J791	TO	J793	TO	J795	TO	J797	TO	J799	TO	J801	TO	J803	TO	J805	TO	J807	TO	J809	TO	J811	TO	J813	TO	J815	TO	J817	TO	J819	TO	J821	TO	J823	TO	J825	TO	J827	TO	J829	TO	J831	TO	J833	TO	J835	TO	J837	TO	J839	TO	J841	TO	J843	TO	J845	TO	J847	TO	J849	TO	J851	TO	J853	TO	J855	TO	J857	TO	J859	TO	J861	TO	J863	TO	J865	TO	J867	TO	J869	TO	J871	TO	J873	TO	J875	TO	J877	TO	J879	TO	J881	TO	J883	TO	J885	TO	J887	TO	J889	TO	J891	TO	J893	TO	J895	TO	J897	TO	J899	TO	J901	TO	J903	TO	J905	TO	J907	TO	J909	TO	J911	TO	J913	TO	J915	TO	J917	TO	J919	TO	J921	TO	J923	TO	J925	TO	J927	TO	J929	TO	J931	TO	J933	TO	J935	TO	J937	TO	J939	TO	J941	TO	J943	TO	J945	TO	J947	TO	J949	TO	J951	TO	J953	TO	J955	TO	J957	TO	J959	TO	J961	TO	J963	TO	J965	TO	J967	TO	J969	TO	J971	TO	J973	TO	J975	TO	J977	TO	J979	TO	J981	TO	J983	TO	J985	TO	J987	TO	J989	TO	J991	TO	J993	TO	J995	TO	J997	TO	J999	TO	J1001	TO	J1003	TO	J1005	TO	J1007	TO	J1009	TO	J1011	TO	J1013	TO	J1015	TO	J1017	TO	J1019	TO	J1021	TO	J1023	TO	J1025	TO	J1027	TO	J1029	TO	J1031	TO	J1033	TO	J1035	TO	J1037	TO	J1039	TO	J1041	TO	J1043	TO	J1045	TO	J1047	TO	J1049	TO	J1051	TO	J1053	TO	J1055	TO	J1057	TO	J1059	TO	J1061	TO	J1063	TO	J1065	TO	J1067	TO	J1069	TO	J1071	TO	J1073	TO	J1075	TO	J1077	TO	J1079	TO	J1081	TO	J1083	TO	J1085	TO	J1087	TO	J1089	TO	J1091	TO	J1093	TO	J1095	TO	J1097	TO	J1099	TO	J1101	TO	J1103	TO	J1105	TO	J1107	TO	J1109	TO	J1111	TO	J1113	TO	J1115	TO	J1117	TO	J1119	TO	J1121	TO	J1123	TO	J1125	TO	J1127	TO	J1129	TO	J1131	TO	J1133	TO	J1135	TO	J1137	TO	J1139	TO	J1141	TO	J1143	TO	J1145	TO	J1147	TO	J1149	TO	J1151	TO	J1153	TO	J1155	TO	J1157	TO	J1159	TO	J1161	TO	J1163	TO	J1165	TO	J1167	TO	J1169	TO	J1171	TO	J1173	TO	J1175	TO	J1177	TO	J1179	TO	J1181	TO	J1183	TO	J1185	TO	J1187	TO	J1189	TO	J1191	TO	J1193	TO	J1195	TO	J1197	TO	J1199	TO	J1201	TO	J1203	TO	J1205	TO	J1207	TO	J1209	TO	J1211	TO	J1213	TO	J1215	TO	J1217	TO	J1219	TO	J1221	TO	J1223	TO	J1225	TO	J1227	TO	J1229	TO	J1231	TO	J1233	TO	J1235	TO	J1237	TO	J1239	TO	J1241	TO	J1243	TO	J1245	TO	J1247	TO	J1249	TO	J1251	TO	J1253	TO	J1255	TO	J1257	TO	J1259	TO	J1261	TO	J1263	TO	J1265	TO	J1267	TO	J1269	TO	J1271	TO	J1273	TO	J1275	TO	J1277	TO	J1279	TO	J1281	TO	J1283	TO	J1285	TO	J1287	TO	J1289	TO	J1291	TO	J1293	TO	J1295	TO	J1297	TO	J1299	TO	J1301	TO	J1303	TO	J1305	TO	J1307	TO	J1309	TO	J1311	TO	J1313	TO	J1315	TO	J1317	TO	J1319	TO	J1321	TO	J1323	TO	J1325	TO	J1327	TO	J1329	TO	J1331	TO	J1333	TO	J1335	TO	J1337	TO	J1339	TO	J1341	TO	J1343	TO	J1345	TO	J1347	TO	J1349	TO	J1351	TO	J1353	TO	J1355	TO	J1357	TO	J1359	TO	J1361	TO	J1363	TO	J1365	TO	J1367	TO	J1369	TO	J1371	TO	J1373	TO	J1375	TO	J1377	TO	J1379	TO	J1381	TO	J1383	TO	J1385	TO	J1387	TO	J1389	TO	J1391	TO	J1393	TO	J1395	TO	J1397	TO	J1399	TO	J1401	TO	J1403	TO	J1405	TO	J1407	TO	J1409	TO	J1411	TO	J1413	TO	J1415	TO	J1417	TO	J1419	TO	J1421	TO	J1423	TO	J1425	TO	J1427	TO	J1429	TO	J1431	TO	J1433	TO	J1435	TO	J1437	TO	J1439	TO	J1441	TO	J1443	TO	J1445	TO	J1447	TO	J1449	TO	J1451	TO	J1453	TO	J1455	TO	J1457	TO	J1459	TO	J1461	TO	J1463	TO	J1465	TO	J1467	TO	J1469	TO	J1471	TO	J1473	TO	J1475	TO	J1477	TO	J1479	TO	J1481	TO	J1483	TO	J1485	TO	J1487	TO	J1489	TO	J1491	TO	J1493	TO	J1495	TO	J1497	TO	J1499	TO	J1501	TO	J1503	TO	J1505	TO	J1507	TO	J1509	TO	J1511	TO	J1513	TO	J1515	TO	J1517	TO	J1519	TO	J1521	TO	J1523	TO	J1525	TO	J1527	TO	J1529	TO	J1531	TO	J1533	TO	J1535	TO	J1537	TO	J1539	TO	J1541	TO	J1543	TO	J1545	TO	J1547	TO	J1549	TO	J1551	TO	J1553	TO	J1555	TO	J1557	TO	J1559	TO	J1561	TO	J1563	TO	J1565	TO	J1567	TO	J1569	TO	J1571	TO	J1573	TO	J1575	TO	J1577	TO	J1579	TO	J1581	TO	J1583	TO	J1585	TO	J1587	TO	J1589	TO	J1591	TO	J1593	TO	J1595	TO	J1597	TO	J1599	TO	J1601	TO	J1603	TO	J1605	TO	J1607	TO	J1609	TO	J1611	TO	J1613	TO	J1615	TO	J1617	TO	J1619	TO	J1621	TO	J1623	TO	J1625	TO	J1627	TO	J1629	TO	J1631	TO	J1633	TO	J1635	TO	J1637	TO	J1639	TO	J1641	TO	J1643	TO	J1645	TO	J1647	TO	J1649	TO	J1651	TO	J1653	TO	J1655	TO	J1657	TO	J1659	TO	J1661	TO	J1663	TO	J1665	TO	J1667	TO	J1669	TO	J1671	TO	J1673	TO	J1675	TO	J1677	TO	J1679	TO	J1681	TO	J1683	TO	J1685	TO	J1687	TO	J1689	TO	J1691	TO	J1693	TO	J1695	TO	J1697	TO	J1699	TO	J1701	TO	J1703	TO	J1705	TO	J1707	TO	J1709	TO	J1711	TO	J1713	TO	J1715	TO	J1717	TO	J1719	TO	J1721	TO	J1723	TO
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## MPU A4

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## VOLTAGE REGULATOR / SOLENOID DRIVER A3

[illegible]

**NOTES:**

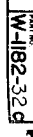
- NOTES.
1. THESE PINS ARE RESERVED FOR FUTURE USE.
  2. WIRE COLOR ARE SHOWN FOR ALL CONNECTOR PINS. SOME WIRE MAY NOT BE USED IN ALL GAMES.
  3. X INDICATES AID TEST POINT

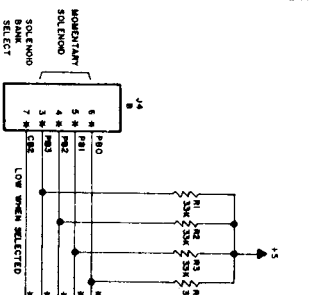
WIRE COLOR CODE

1-RED  
2-BLUE  
3-YELLOW  
4-GREEN  
5-WHITE  
6-BROWN  
7-ORANGE  
8-BLACK  
9-GRAY  
0-NO TRACE

11. WEIGHT		12. MANUFACTURING CORP.												13. DATE OF INFO. SUPPLIED	
11.1 GROSS WEIGHT		12.1 NAME OF MANUFACTURING CORP.												13.1 DATE	
11.2 NET WEIGHT		12.2 ADDRESS OF MANUFACTURING CORP.												13.2 DATE	
11.3 TARE WEIGHT		12.3 CITY												13.3 DATE	
11.4 TARE WEIGHT		12.4 STATE												13.4 DATE	
11.5 TARE WEIGHT		12.5 COUNTRY												13.5 DATE	
11.6 TARE WEIGHT		12.6 ZIP CODE												13.6 DATE	
11.7 TARE WEIGHT		12.7 PHONE NO.												13.7 DATE	
11.8 TARE WEIGHT		12.8 FAX NO.												13.8 DATE	
11.9 TARE WEIGHT		12.9 E-MAIL ADDRESS												13.9 DATE	
11.10 TARE WEIGHT		12.10 WEBSITE ADDRESS												13.10 DATE	
11.11 TARE WEIGHT		12.11 OTHER INFORMATION												13.11 DATE	
11.12 TARE WEIGHT		12.12 OTHER INFORMATION												13.12 DATE	
11.13 TARE WEIGHT		12.13 OTHER INFORMATION												13.13 DATE	
11.14 TARE WEIGHT		12.14 OTHER INFORMATION												13.14 DATE	
11.15 TARE WEIGHT		12.15 OTHER INFORMATION												13.15 DATE	
11.16 TARE WEIGHT		12.16 OTHER INFORMATION												13.16 DATE	
11.17 TARE WEIGHT		12.17 OTHER INFORMATION												13.17 DATE	
11.18 TARE WEIGHT		12.18 OTHER INFORMATION												13.18 DATE	
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11.71 TARE WEIGHT		12.71 OTHER INFORMATION												13.71 DATE	
11.72 TARE WEIGHT		12.72 OTHER INFORMATION												13.72 DATE	
11.73 TARE WEIGHT															

WIRING DIAGRAM - BACK BOX





- NOTES:

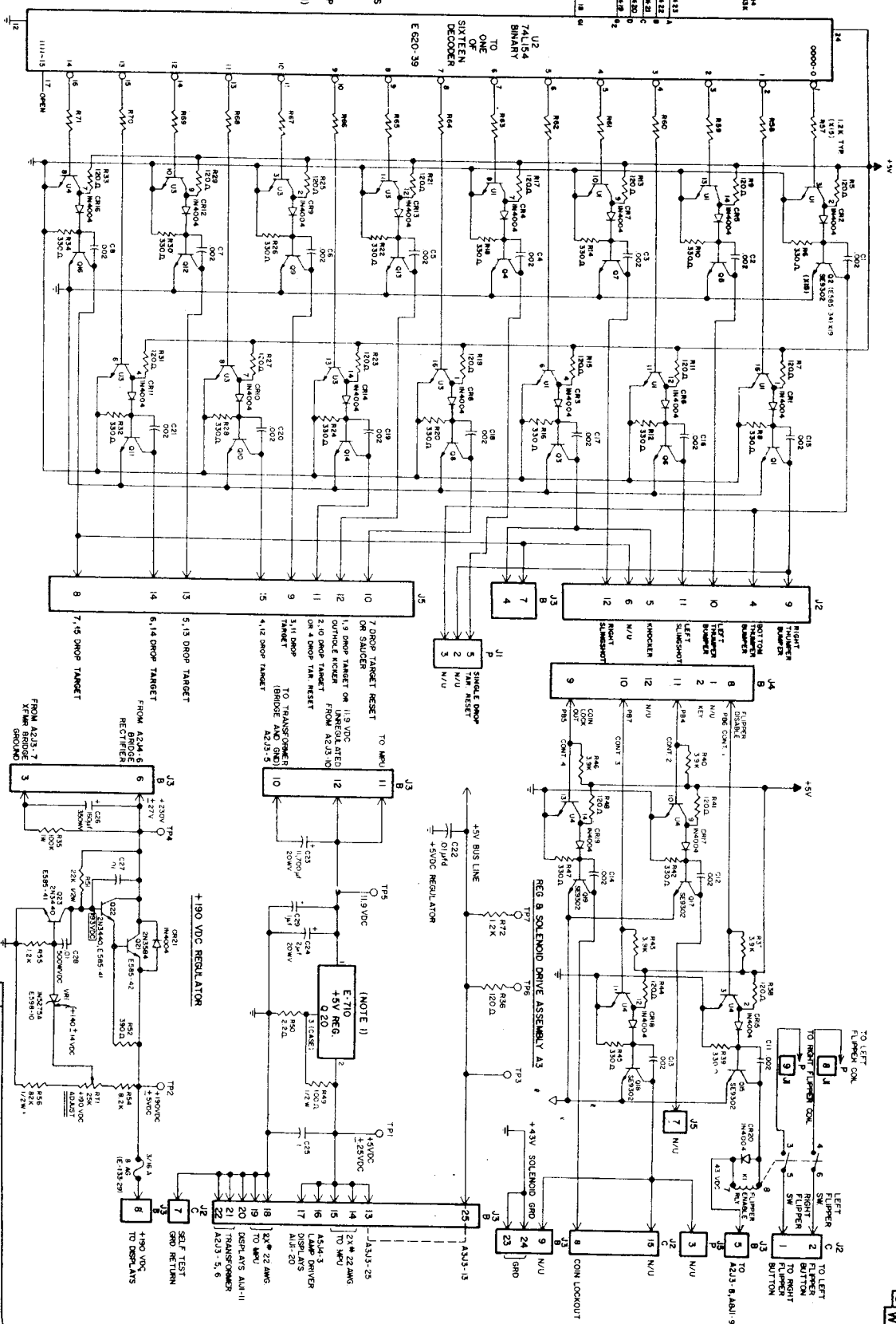
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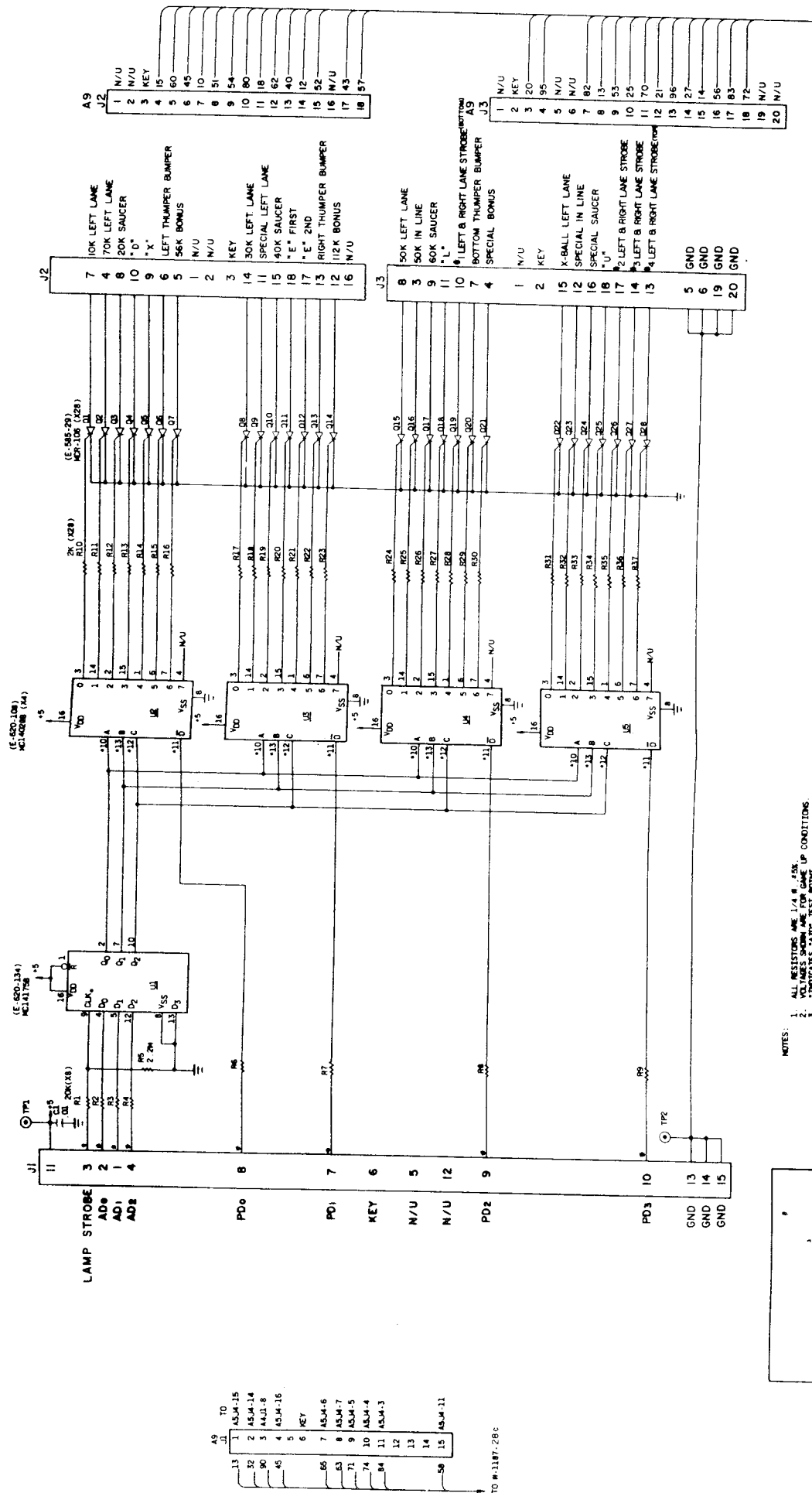
CONNECTOR CODE

C → ROUTE TO CABINET CONN  
B → ROUTE TO BACK BOX CONN  
P → ROUTE TO PLAYFIELD CONN

LAST NUMBER USED

R72	N/U C9,C10
C29	N/U Q20
Q23	
CR21	
YR1	

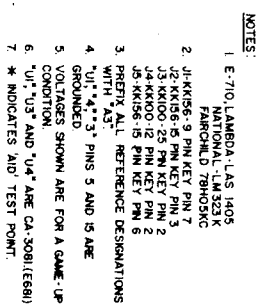
[illegible][illegible]



NOTES:

1. ALL RESISTORS ARE 1/4 W. 5%.
2. VOLTAGES SHOWN ARE FOR GATE UP CONDITIONS.
3. \*INDICATES "AID" TEST POINT.
4. SOW'S ARE NON-LOG-1. (E-SIG 29).
5. PREFIX ALL REFERENCE DESIGNATIONS WITH "AP".

(1) LICENSEE'S NAME AND ADDRESS: <b>BEALY MANUFACTURING CORP., 1220 300 COMSTOCK AVENUE CHICAGO, ILLINOIS</b>		(2) MAKE AND MODEL OF MOTOR VEHICLE: <b>AUXILIARY LAMP DRIVER AS EIGHT BALL DELUXE</b>		(3) LICENSEE'S SIGNATURE: <i>[Signature]</i>		(4) EXPIRATION DATE: <b>12-31-60</b>		(5) LICENSEE'S SEX: <b>M</b>		(6) LICENSEE'S AGE: <b>38</b>		(7) LICENSEE'S HEIGHT: <b>5' 10"</b>		(8) LICENSEE'S WEIGHT: <b>170</b>		(9) LICENSEE'S EYES: <b>BLUE</b>		(10) LICENSEE'S HAIR: <b>BROWN</b>		(11) LICENSEE'S BUILD: <b>SLIM</b>		(12) LICENSEE'S COMPLEXION: <b>Fair</b>		(13) LICENSEE'S SCARS OR TATTOOS: <b>None</b>		(14) LICENSEE'S ALCOHOL TEST: <b>None</b>		(15) LICENSEE'S DRUG TEST: <b>None</b>		(16) LICENSEE'S MENTAL TEST: <b>None</b>		(17) LICENSEE'S PHYSICAL TEST: <b>None</b>		(18) LICENSEE'S VISION TEST: <b>None</b>		(19) LICENSEE'S HEARING TEST: <b>None</b>		(20) LICENSEE'S BALANCE TEST: <b>None</b>		(21) LICENSEE'S COORDINATION TEST: <b>None</b>		(22) LICENSEE'S REACTION TEST: <b>None</b>		(23) LICENSEE'S ENDURANCE TEST: <b>None</b>		(24) LICENSEE'S STRENGTH TEST: <b>None</b>		(25) LICENSEE'S SENSE OF DIRECTION: <b>None</b>		(26) LICENSEE'S SENSE OF TIME: <b>None</b>		(27) LICENSEE'S SENSE OF SPACE: <b>None</b>		(28) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(29) LICENSEE'S SENSE OF PAIN: <b>None</b>		(30) LICENSEE'S SENSE OF HEAT: <b>None</b>		(31) LICENSEE'S SENSE OF COLD: <b>None</b>		(32) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(33) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(34) LICENSEE'S SENSE OF AIR: <b>None</b>		(35) LICENSEE'S SENSE OF WATER: <b>None</b>		(36) LICENSEE'S SENSE OF FIRE: <b>None</b>		(37) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(38) LICENSEE'S SENSE OF SOUND: <b>None</b>		(39) LICENSEE'S SENSE OF TASTE: <b>None</b>		(40) LICENSEE'S SENSE OF SMELL: <b>None</b>		(41) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(42) LICENSEE'S SENSE OF PAIN: <b>None</b>		(43) LICENSEE'S SENSE OF HEAT: <b>None</b>		(44) LICENSEE'S SENSE OF COLD: <b>None</b>		(45) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(46) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(47) LICENSEE'S SENSE OF AIR: <b>None</b>		(48) LICENSEE'S SENSE OF WATER: <b>None</b>		(49) LICENSEE'S SENSE OF FIRE: <b>None</b>		(50) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(51) LICENSEE'S SENSE OF SOUND: <b>None</b>		(52) LICENSEE'S SENSE OF TASTE: <b>None</b>		(53) LICENSEE'S SENSE OF SMELL: <b>None</b>		(54) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(55) LICENSEE'S SENSE OF PAIN: <b>None</b>		(56) LICENSEE'S SENSE OF HEAT: <b>None</b>		(57) LICENSEE'S SENSE OF COLD: <b>None</b>		(58) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(59) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(60) LICENSEE'S SENSE OF AIR: <b>None</b>		(61) LICENSEE'S SENSE OF WATER: <b>None</b>		(62) LICENSEE'S SENSE OF FIRE: <b>None</b>		(63) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(64) LICENSEE'S SENSE OF SOUND: <b>None</b>		(65) LICENSEE'S SENSE OF TASTE: <b>None</b>		(66) LICENSEE'S SENSE OF SMELL: <b>None</b>		(67) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(68) LICENSEE'S SENSE OF PAIN: <b>None</b>		(69) LICENSEE'S SENSE OF HEAT: <b>None</b>		(70) LICENSEE'S SENSE OF COLD: <b>None</b>		(71) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(72) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(73) LICENSEE'S SENSE OF AIR: <b>None</b>		(74) LICENSEE'S SENSE OF WATER: <b>None</b>		(75) LICENSEE'S SENSE OF FIRE: <b>None</b>		(76) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(77) LICENSEE'S SENSE OF SOUND: <b>None</b>		(78) LICENSEE'S SENSE OF TASTE: <b>None</b>		(79) LICENSEE'S SENSE OF SMELL: <b>None</b>		(80) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(81) LICENSEE'S SENSE OF PAIN: <b>None</b>		(82) LICENSEE'S SENSE OF HEAT: <b>None</b>		(83) LICENSEE'S SENSE OF COLD: <b>None</b>		(84) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(85) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(86) LICENSEE'S SENSE OF AIR: <b>None</b>		(87) LICENSEE'S SENSE OF WATER: <b>None</b>		(88) LICENSEE'S SENSE OF FIRE: <b>None</b>		(89) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(90) LICENSEE'S SENSE OF SOUND: <b>None</b>		(91) LICENSEE'S SENSE OF TASTE: <b>None</b>		(92) LICENSEE'S SENSE OF SMELL: <b>None</b>		(93) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(94) LICENSEE'S SENSE OF PAIN: <b>None</b>		(95) LICENSEE'S SENSE OF HEAT: <b>None</b>		(96) LICENSEE'S SENSE OF COLD: <b>None</b>		(97) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(98) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(99) LICENSEE'S SENSE OF AIR: <b>None</b>		(100) LICENSEE'S SENSE OF WATER: <b>None</b>		(101) LICENSEE'S SENSE OF FIRE: <b>None</b>		(102) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(103) LICENSEE'S SENSE OF SOUND: <b>None</b>		(104) LICENSEE'S SENSE OF TASTE: <b>None</b>		(105) LICENSEE'S SENSE OF SMELL: <b>None</b>		(106) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(107) LICENSEE'S SENSE OF PAIN: <b>None</b>		(108) LICENSEE'S SENSE OF HEAT: <b>None</b>		(109) LICENSEE'S SENSE OF COLD: <b>None</b>		(110) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(111) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(112) LICENSEE'S SENSE OF AIR: <b>None</b>		(113) LICENSEE'S SENSE OF WATER: <b>None</b>		(114) LICENSEE'S SENSE OF FIRE: <b>None</b>		(115) LICENSEE'S SENSE OF LIGHT: <b>None</b>		(116) LICENSEE'S SENSE OF SOUND: <b>None</b>		(117) LICENSEE'S SENSE OF TASTE: <b>None</b>		(118) LICENSEE'S SENSE OF SMELL: <b>None</b>		(119) LICENSEE'S SENSE OF TOUCH: <b>None</b>		(120) LICENSEE'S SENSE OF PAIN: <b>None</b>		(121) LICENSEE'S SENSE OF HEAT: <b>None</b>		(122) LICENSEE'S SENSE OF COLD: <b>None</b>		(123) LICENSEE'S SENSE OF HUMIDITY: <b>None</b>		(124) LICENSEE'S SENSE OF DRYNESS: <b>None</b>		(125) LICENSEE'S SENSE OF AIR: <b>None</b>		(126) LICENSEE'S SENSE OF WATER: <b>None</b>		(127) LICENSEE'S SENSE OF FIRE: <b>None</b>		(128) LICENSEE'S SENSE OF LIGHT: <b>None</b>	
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CONNECTOR CODE

C → ROUTE TO CABINET CONN  
B → ROUTE TO BACK BOX CONN  
P → ROUTE TO PLAYFIELD CONN

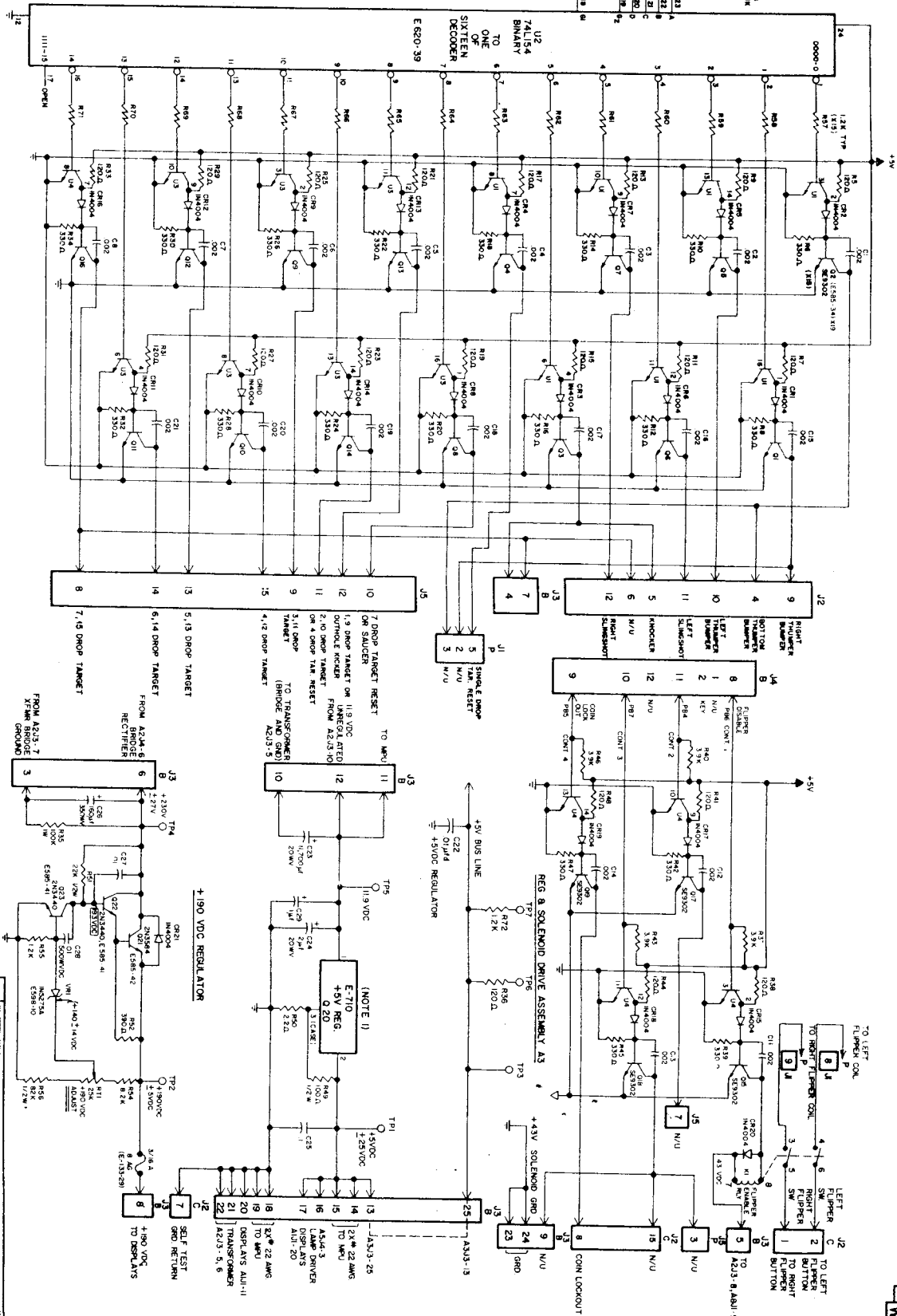
M/Z	N/U C9, C10
C29	N/U Q20
Q23	
CR21	
VR1	

**LAST NUMBER USED**

N/U	Q20
N/U	Q23
N/U	Q29
N/U	Q30
N/U	Q31
N/U	Q32
N/U	Q33
N/U	Q34
N/U	Q35
N/U	Q36
N/U	Q37
N/U	Q38
N/U	Q39
N/U	Q40
N/U	Q41
N/U	Q42
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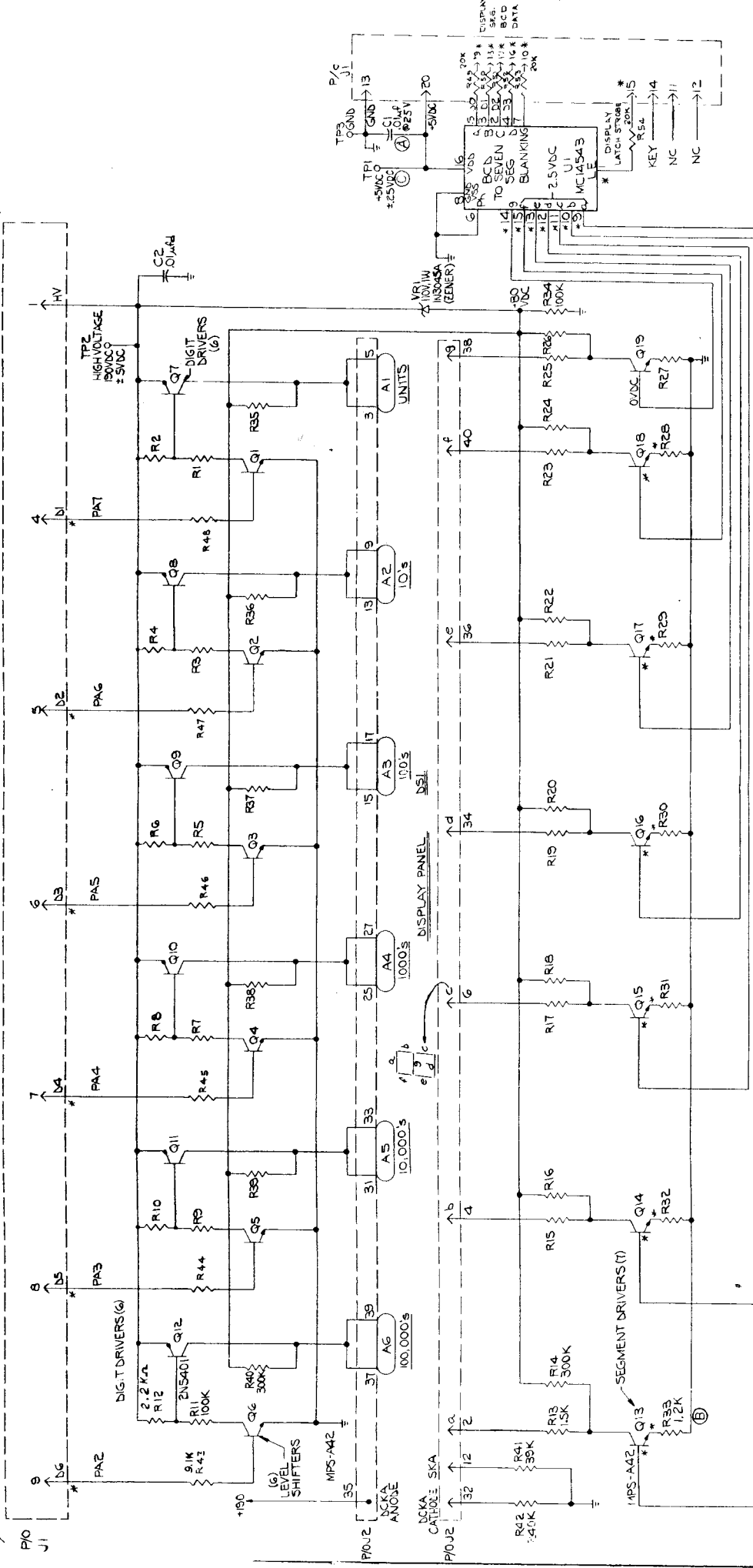
CR21  
VR1

0627

[illegible]

W-1183-326

DISPLAY DIGITABLE



- NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE  $\pm 5\%$  1/4W.
  2. PREFIX ALL REFERENCE DESIG. WITH ASSEMBLY REFERENCE DESIG. "A".
  3. \* INDICATES A/D TEST POINT.

REVISIONS

NO.	DATE	BY	CHKD.	DESCRIPTION
1	10/1/68	WJ	WJ	INITIAL DESIGN
2	10/1/68	WJ	WJ	REVISION 1
3	10/1/68	WJ	WJ	REVISION 2

DESIGNER: WJ

CHECKED: WJ

DATE: 10/1/68

BY: WJ

CHKD.: WJ

DESCRIPTION: DISPLAY BOARD SCHEMATIC

AS-2518-21

W-1184-1c

REVISIONS

NO.	DATE	BY	CHKD.	DESCRIPTION
1	10/1/68	WJ	WJ	INITIAL DESIGN
2	10/1/68	WJ	WJ	REVISION 1
3	10/1/68	WJ	WJ	REVISION 2

DESIGNER: WJ

CHECKED: WJ

DATE: 10/1/68

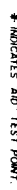
BY: WJ

CHKD.: WJ

DESCRIPTION: DISPLAY BOARD SCHEMATIC

AS-2518-21

W-1184-1c



LATCH STROBE	→ 15	A4JL (refer to W-1187 for Pin No.)
RCA 20K	→ 14	
KEY	→ 14	
NC	→ 11	

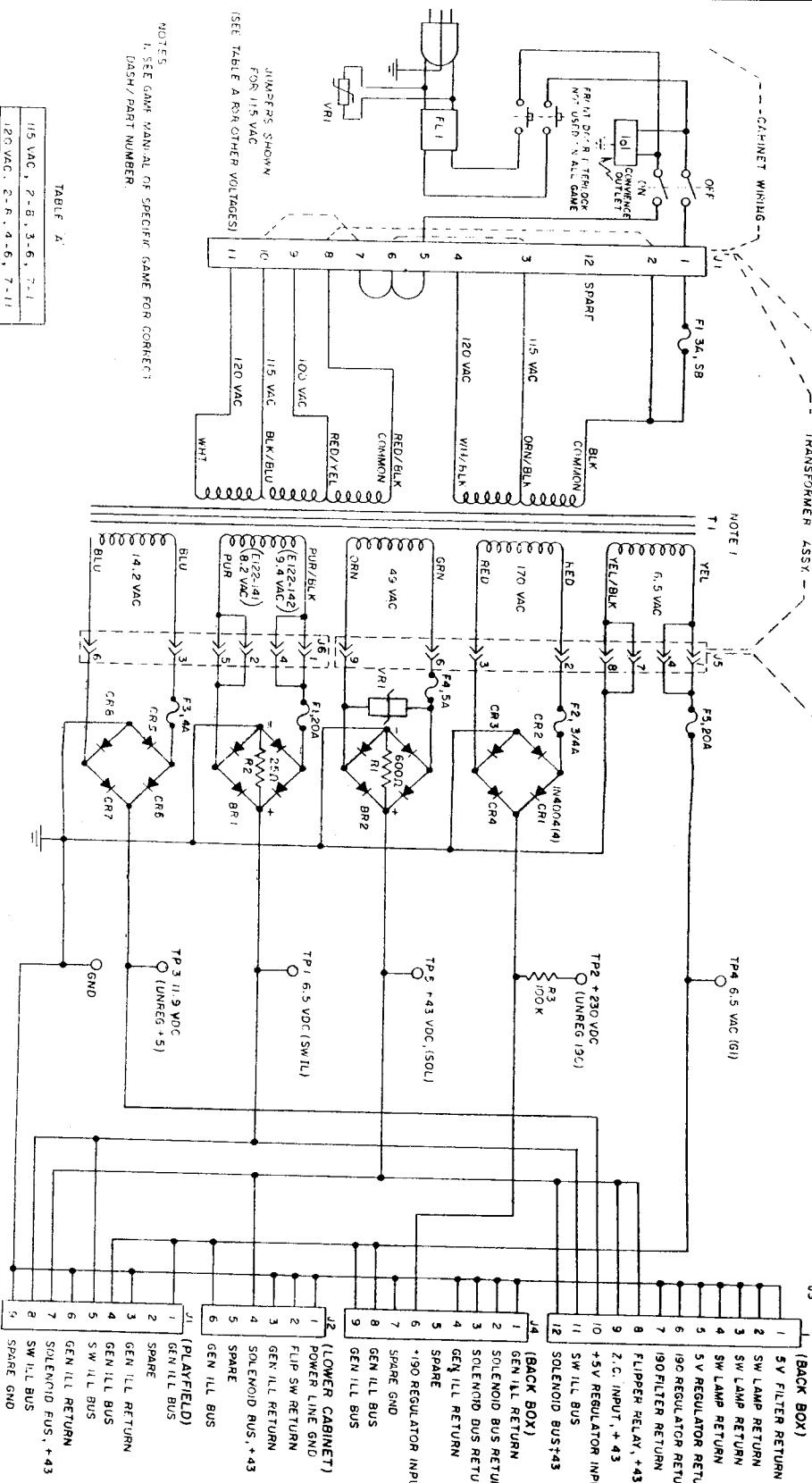
PART		DISPOSITION		ITEM NO.		QTY		UNIT		PRICE		TOTAL		REMARKS	
NO.	DESCRIPTION	QTY	UNIT	PRICE	TOTAL	QTY	UNIT	PRICE	TOTAL	QTY	UNIT	PRICE	TOTAL	QTY	UNIT
1	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
2	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
3	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
4	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
5	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
6	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
7	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
8	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
9	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
10	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
11	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
12	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
13	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
14	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
15	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
16	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
17	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
18	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
19	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
20	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
21	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
22	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
23	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
24	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
25	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
26	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
27	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
28	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
29	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
30	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
31	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										
32	7" x 11" 1/2" BOARD	100	FT	1.00	100.00										

GENERAL ALL INFORMATION		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD		7" x 11" 1/2" BOARD	
MANUFACTURER'S NAME		CITY		STATE		COUNTRY		DATE		TIME		PRICE		TOTAL	
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AS-2877-X TRANSFORMER POWER ASSEMBLY  
SEE NOTE 1  
AS-3071-X  
AS-208-54, POWER MODULE

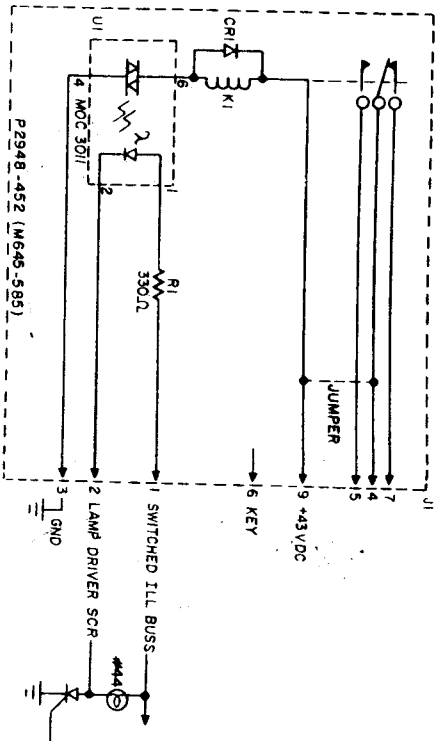


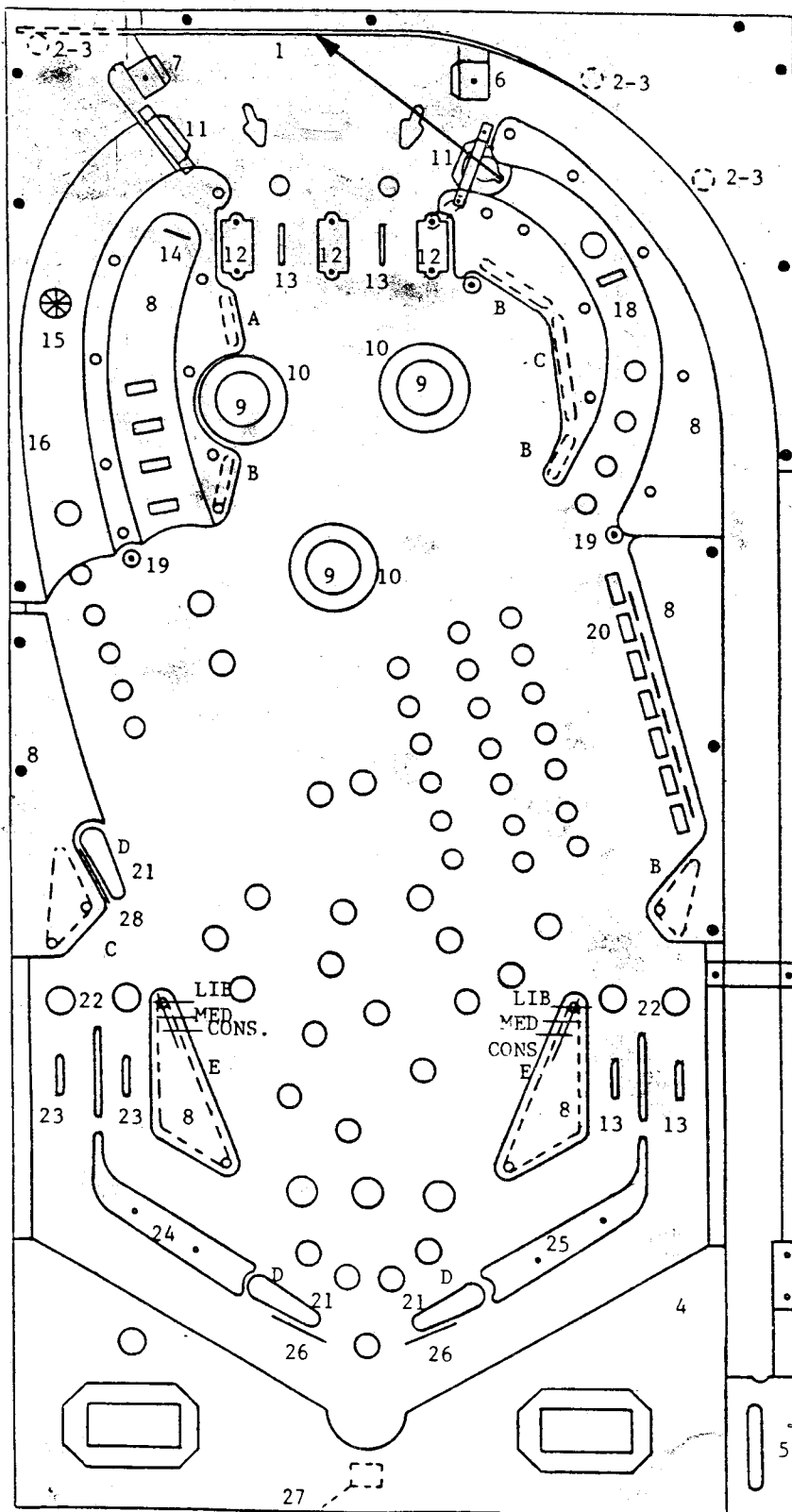
NOTES  
1. SEE GAME MANUAL OF SPECIFIC GAME FOR CORRECT  
DASH / PART NUMBER.

TABLE 2.	
115 VAC, 2-8, 3-6, 7-1	
120 VAC, 2-6, 4-6, 7-11	
220 VAC, 4-8, 7-?	
240 VAC, 4-8, 7-11	

[illegible]



[illegible]



VECTOR DRAWING FOR  
EIGHT BALL DELUXE  
EJECT SAUCER

TO BE KICKED ON BALL ROD  
APPROXIMATELY CENTER OF PLAYFIELD.

PLAYFIELD MYLAR PROTECTORS

FO-589

ENCLOSED ARE TWO MYLAR PROTECTORS WHICH MAY BE ATTACHED TO THE PLAYFIELD IN FRONT OF THE SLINGSHOT KICKERS AS SHOWN IN SKETCH. THESE WILL HELP TO PRESERVE PAINT FINISH IN FRONT OF SLINGSHOTS.

TO APPLY, SIMPLY REMOVE PAPER BACKING AND PLACE MYLAR WITH FLAT EDGE TOUCHING THE TWO SLINGSHOT POSTS.

